THE JOURNAL

OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

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DEPARTMENT OF AGRICULTURE, VICTORIA

RED POLL DAIRY HERD

YOUNG BULLS FOR SALE

TO VICTORIAN DAIRYMEN

DAM.	Date of Birth.	RECORD OF DAM.				PRICE.
		Milk lbs.	Average Test.	Fat lbs.	Butter lbs.	
	Sired by "NICOTINE" by ACTON DEWSTONE (imp.)					
Pennsylvania ..	2.7.14	6340	4·28	271·9	310	13 Guineas
Havana ...	17.8.14	6365	4·15	264·3	301¼	13 ,,
Kentucky ..	21.8.14	7905	3·96	313·3	357¼	15 ,,
Connecticut ...	3.4.15	6780	5·36	364·0	415	18 ,,
Vuelta ...	25.4.15	7750	6·24	485·1	553	24 ,,
Cameo ...	23.5.15	5454	5·15	281·2	320½	14 ,,
Sumatra ...	24.5.15	9062	4·67	423·4	482¼	21 ,,
	Sired by "BELMONT" by ACTON AJAX (imp.)					
Mongolia ...	20.9.14	Heifer.	No Record.			5 ,,
	Sired by "GANYMEDE"					
Ontario ...	18.12.14	Heifer.	No Record.			5 ,,

The prices are based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter ***fat*** yielded.

For History and Record of the Herd see Journal of Agriculture, September, 1914.

Calves under six months old may be purchased for delivery at that age.

Inspection by arrangement with Mr. E. STEER, Herdsman, Central Research Farm, Werribee.

Application for purchase to DIRECTOR OF AGRICULTURE, MELBOURNE.

THE JOURNAL

OF

The Department of Agriculture

OF

VICTORIA.

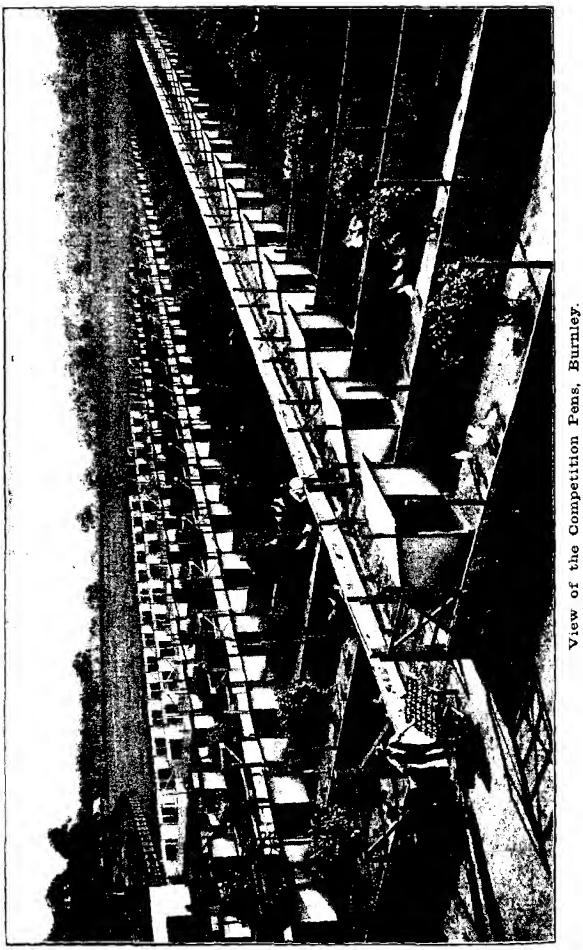
Vol. XIII. Part 6. 10th June, 1915.

REPORT ON THE FOURTH EGG-LAYING COMPETITION AT BURNLEY, 1914-15.

By A. Hart, Chief Poultry Expert.

In presenting the annual report on the Egg-laying Competition just concluded, I beg to bring under notice several valuable and important features in connexion with this test. Records have been broken, different systems of feeding have been successfully instituted, and the Light and Heavy Breeds have been tested singly. These different methods have brought the test into much prominence, and the result must be accepted as a certain proof of the value of the industry, when conducted on proper lines and under suitable conditions. The Egg-laying Competitions instituted by the Department have already been productive of much benefit to the industry, and the consistent and also rapid improvements in the egg production of the birds competing in these tests have been extremely satisfactory in every respect. The figures put up in the tests just concluded are in several instances not only records for our Commonwealth, but can also be classed as world's records. The value of these tests from an educational point of view, as well as from an experimental one, is of much benefit to the Poultry Industry generally. The public have the opportunity to visit Burnley and inspect the competing birds, seeing for themselves the conditions under which they are kept and fed. In this way useful and valuable instruction is provided, and an object-lesson furnished which all poultry-keepers may follow if they wish. The really excellent results which have attended the recent tests should be an incentive to increase the ranks of poultry-keepers. Although the present high prices of food may be a considerable handicap, many instances are recorded where poultry breeders are securing profitable returns, even under the prevailing conditions. A good proportion of these have profited by the information which has from time to time been

supplied to them, and also from the supervision extended by the departmental officer, and it is gratifying to find so many successes which are attributable to practical Government management.



View of the Competition Pens, Burnley.

Laying competitions in Victoria were first instituted in 1904-5. They were then conducted at Dookie Agricultural College, under the supervision of the Principal, Mr. H. Pye. The first test was won by White

Leghorns, the six birds producing 1,313 eggs for the twelve months. In 1905-6 Silver Wyandottes scored the leading award with 1,296 eggs, and White Leghorns were successful in 1907-8, producing 1,314 eggs. The tests were then discontinued at Dookie, and the first laying competitions held at Burnley under direct Government management took place during 1911-12. This test was won by six White Leghorns, producing 1,566 eggs in twelve months. All breeds were eligible to compete, and Black Orpingtons, Silver Wyandottes, Minorcas, Faverolles, White Wyandottes, and Golden Wyandottes entered into competition with White Leghorns, the latter winning by a big majority, and birds of the same variety being second. In the other breeds, Black Orpingtons put up the best results, producing 1,240 eggs in the 12 months. In the test of 1912-13, all breeds competed together, and all money prizes were won by White

Audience which attended Poultry Lecture and Demonstration by Messrs. Hart and Rintoul, at the Burnley School of Horticulture.

Leghorns. The winning score was 1,468 eggs, and the second was 1,454. In this test Black Orpingtons scored over the other heavy breeds, the six birds producing 1,245 eggs. Although the leading figures were behind those of the previous year, the total egg production of the seventy pens was better, an increase of ten eggs per pen being received. The test of 1913-14 was again a decided victory for White Leghorns, birds of this variety gaining the thirty-nine leading positions. The figures secured by the winners were first class. The six birds produced 1,667 eggs for the year, this being an average of 277 per bird. The sixty-three pens of six birds each averaged over 212 eggs per bird. When it is taken into consideration that this included all breeds, the result must be classed as a really good average.

In the tests of 1914-15 four classes were provided, with the object of comparison as to the merits of the different breeds, and also the various methods of feeding. Light breeds had two classes, and heavy breeds a similar number, and the entries made up a total of ninety-eight in all. This included fifty pens of White Leghorns fed on wet mash, nineteen pens of White Leghorns fed on dry mash, eighteen pens (heavy breeds) fed on wet mash, and eleven pens (heavy breeds) fed on dry mash. The object of providing separate tests for light and heavy breeds respectively was to encourage entries in the heavy breeds. In all previous tests the whole of the prize money and leading positions were gained by White Leghorns. It was considered that the all-round and utility breeds should be given their opportunity, as the competitions were not only instituted to increase the egg production of all and every breed, but were also intended to bring the poultry industry into prominence, and educate the public as to the respective value of the various varieties. It was admitted that the heavy breeds had no chance of winning when in

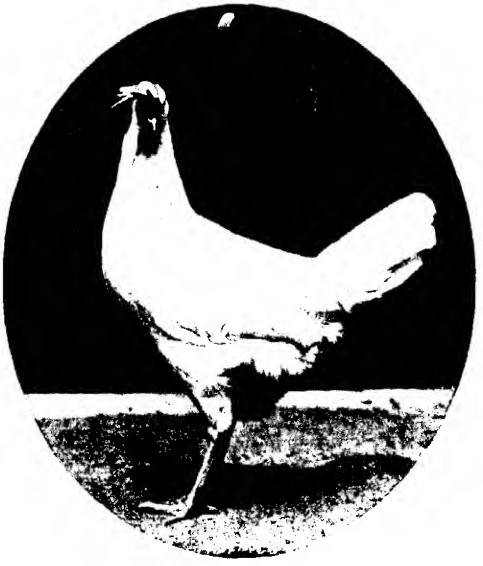
Good Laying Type of Head, one of six White Leghorns, with an average of 283 eggs in 12 months.

Bad Laying Type of Head, one of six White Leghorns, with an average of 144 eggs in 12 months.

competition with high-grade egg-producing White Leghorns of the present improved laying strains. But the merits of the heavy breeds as table birds had also to be considered, and the incentive for breeders to improve their stock was provided by the insertion of separate classes in the competition. An indication of the popularity of these tests can be noted by the fact that last year the entries received were very much larger than the available pens, and a good number of owners were disappointed.

The tests were conducted on very methodical and up-to-date lines. The birds were kept in houses and pens constructed on cheap and also very efficient patterns, which can easily be copied by any poultry-keeper at a moderate cost. Warmth and freedom from draughts during the winter months were two of the special features of this house, and plenty of shade and ventilation was also available during the summer. The feeding was performed with regularity, and the various quantities of

different foods were carefully weighed and mixed. The dry mash tests were conducted for the first time in Victoria, the object being to provide authentic information as to their relative qualities in comparison with the wet mash. The result was very satisfactory, and to this method of feeding can be given the honour of producing the world's record from six birds. They produced 1,699 eggs for the twelve months, this being an average of over 283 eggs per bird, and establishing a record, which, in the past, was regarded as an utter impossibility. The laying from this pen was exceptionally heavy, and the eggs produced were of good average size. In comparing the results of the whole of the White Leghorns fed on dry mash with those fed on wet mash, the latter returned



How to increase Egg Production and the Size of the Egg.—Single Test each Pullet for one year.

over 50 eggs more from each pen. The cost of food was about the same, but the dry mash birds had the advantage in respect to labour, and this would probably work out about equal. In the heavy breeds it was not so successful, the result indicating that this system is not so suitable for soft-feathered birds. There is one point, however, which must not be overlooked in these tests. Breeders viewed the dry mash test with a considerable amount of doubt, and for this reason, in every instance, they placed their first choice of six pullets in the wet mash test, and entered their second string in the dry mash. When this is explained, the difference in egg production should not be estimated to work out so high as it appears to do at first sight. When a comparison of the figures can be

made of the birds which are now competing in both sections, I feel confident that the result will place the dry mash birds in a much better position than that shown in the recent test.

The weather conditions during the test just concluded were not conducive to the production of sensational averages. The dry winter months checked laying to some extent, but towards the last months of 1914 the conditions were more favorable. By careful and regular attention, and a liberal supply of mixed foods, the birds were kept up to concert pitch, and at that time breaking of records was anticipated. But sudden weather changes brought about a set-back in several pens which were well up, and as some of the birds went into moult, it handicapped their chances to a great extent. But even with these drawbacks the final results were above expectations, and the averages put up by the whole of the competing birds were very satisfactory. In the light breeds very few instances of broodiness were recorded. In the heavy breeds, however, broodiness was very prevalent. Of course, this it a natural condition with soft-feathered birds, but it told greatly against the egg production of several pens where cases were numerous. During the latter part of the competition the birds were under the care of Mr. J. T. Macaulay, and to his efficient management and regular attention must be given much of the credit for the excellent results attained. It may also be noted that the official figures obtained under Government control are unanimously accepted as authentic and reliable, this indicating that they are compiled and written up with both care and accuracy.

In the light breeds (wet mash) the whole of the fifty pens put up very satisfactory figures, the 300 birds averaging over 219 eggs each. This was a consistent return from such a large number of birds, and proves that high-grade egg-producing stock is now kept and owned by many poultry breeders. The winning pen put up a good performance, and practically won through excellent egg production during the last five weeks of the test, constitution and condition standing to them right to the end. The six birds produced 1,633 eggs in the twelve months, leading the second pen by forty eggs. The latter birds were, however, handicapped by moulting conditions. The third pen was only six eggs behind the second, and the average laying from the three pens (eighteen birds) was over 267 per bird. In the dry mash test (light breeds), the winning pen established a "world's record," the six birds producing 1,699 eggs in the twelve months, and leading the second pen by 185 eggs. A record of this kind must tend to bring Victorian White Leghorns into much prominence, and a strong point in connexion with the achievement is the fact that the owner of the winning birds was practically a beginner. The winners were purchased by Mr. E. A. Lawson for the sum of £75, and Mr. J. H. Gill's third-prize wet-mash pen was sold for £50. Mrs. H. Stevenson refused £60 for her pen. This proves the great value placed by breeders on high-grade egg producers. The rest of the White Leghorns in the dry mash did fairly well, and the total average egg production was as high as could be anticipated.

In the heavy breeds (wet mash) the leading birds put up an excellent performance. The six birds produced 1,562 eggs, averaging over 260 eggs per bird for the twelve months. The second pen laid 1,439 eggs, being 123 behind the winners. Black Orpingtons held the five leading positions, the sixth being taken by Rhode Island Reds, who proved their

worth as egg producers by averaging 212 per bird. The aggregate figures of this test were considerably reduced through some of the competing pens containing very indifferent layers. In the heavy breeds (dry mash) Black Orpingtons held the five leading positions, the sixth

How to make Poultry Pay: Grow plenty of Lucerne.

going to Rhode Island Reds. The winning birds produced 1,210 eggs for the twelve months, the second birds being credited with 1,178. A few very poor layers were competing in this test, and this affected the total average egg production.

First Prize Pen White Leghorns, Light Breeds, Dry Mash Section, owned by W. N. O'Mullane; 1,699 eggs for 12 months' test, constituting Official World's Record.

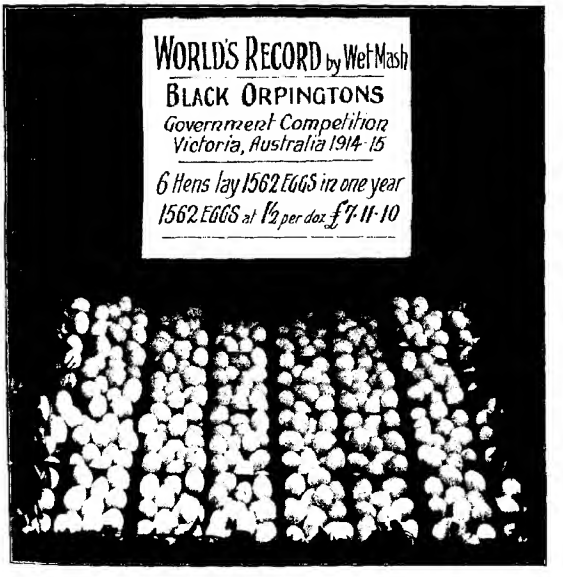
The number of eggs produced by the 588 birds competing in the four tests was 121,804. Their market value was 1s. 2d. per dozen, which works out an average of 20s. 3d. per bird. As this includes all breeds that competed, among which were birds that did not average 100 eggs

each, the figures must be regarded as particularly good. The result of this test, whether the figures are taken for each single breed or the whole

First Prize Pen White Leghorns, Light Breeds, Wet Mash Section, owned by Mrs. H. Stevenson; 1,633 eggs for twelve months' test.

collectively, are very satisfactory, and prove that good work is being done through the medium of these annual tests. Individual high tests

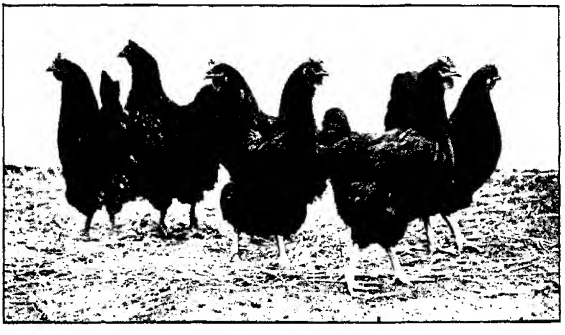
First Prize Pen Black Orpingtons, Heavy Breeds, Wet Mash Section, owned by J. McAllan; 1,562 eggs for 12 months' test. Official World's Record for Heavy Breeds



are certainly very encouraging. But "one swallow does not make a summer," and the object of laying competitions is not to only indicate the leading pens of egg producers. They are also equally valuable in

effecting a decided improvement in the whole of the competing birds, and in this way must be regarded as especially beneficial to the poultry industry generally, improving the flocks of layers in various parts of the State by the distribution of high-grade egg producers. In this age of improvement, unless poultry-keepers take the special advantages that are offered to them in the way of reliable and prolific egg-producing stock, they are certain to be left out in the cold.

In connexion with the tests that are being annually conducted at Burnley, I would suggest that single bird testing be included in the competition, in order to make the records more complete and valuable. This has been practised successfully in both New South Wales and South Australia, and in the former State a White Leghorn hen tested singly has put up a world's record under Government supervision. It is quite certain that the egg production of the six birds included in one pen will vary, and in this case the highest production from one hen cannot be indicated. If the winning White Leghorns in the recent dry mash test



First Prize Pen Black Orpingtons, Heavy Breeds, Dry Mash Section, owned by J. McAllan; 1,210 eggs for 12 months' test.

had been tested singly, it is quite possible that at least one of them would be credited with 300 eggs. A record of this kind would bring our Victorian competitions into great prominence, and it would also insure plenty of outside demand for our stock. The birds which are competing in other tests could be penned singly, or a special class could be provided, and I feel certain that the result would be alike satisfactory to the Department and to the poultry industry generally.

The competitions which started at Burnley on 15th April are progressing satisfactorily. In previous tests a number of the owners did not, apparently, exercise enough care in the selection of their birds, uniformity and even type not receiving sufficient consideration. But, judging by the general appearance of the birds, this defect has been remedied this year, and, if appearances count for anything, they do not include any inferior stock. The owners are becoming educated as to what is required, and the average quality of the whole of the birds is much better and more even than in former tests. The packing up of

the birds from the test just concluded, and the conveying of them to their respective destinations, were completed quickly and effectively. Many letters of appreciation have been received commenting on the excellent condition in which the birds arrived home.

In conclusion, I would draw attention to the fact that Victoria possesses special advantages in respect to poultry-keeping, and for this reason the efforts of the Department of Agriculture in fostering the industry must prove successful. The present time has many drawbacks, particularly the scarcity and high cost of food, but it is to be hoped that in the near future normal conditions will prevail, when the excellent work which has been done by the Department will meet with its due reward, and our poultry industry will assume dimensions which will enable us to make poultry-keeping a very large source of revenue to the State.

FEEDING METHODS.

FORMULA OF WET MASH.

Bran	16 lb.
Ground oats..	4 „
Pollard	20 „
Peameal	4 „
Oatmeal pollard	4 „
Minced liver	8 „

The whole is mixed together with liver soup and given warm, in a crumbly condition. About 2 ozs. is given to each bird in the morning and 1 oz. at midday, mixed with green stuff, consisting of chaffed green lucerne and silver beet.

Evening Meal.—Wheat, oats, crushed maize, varied according to appetite and weather conditions. About 11 ozs. to 13 ozs. is given to each pen of six birds.

Cut onions given occasionally, once a week, as a tonic.

FORMULA OF DRY MASH.

This formula, introduced by the Chief Poultry Expert, resulted in a record number of eggs being produced, viz., W. N. O'Mullane's pen, 1,699 eggs for twelve months' test:—

1. Bran, 54½ lb.; wheaten pollard, 53½ lb.; lucerne pollard, 14 lb.; peameal, 22 lb.; oaten meal pollard, 11 lb.; ground oats (with portion of hulls removed), 19½ lb.; dry molasses or black sugar, 1½ lb.; meat, at 8 a.m., about 3 ozs. of cooked minced liver to each pen. One ounce of salt is allowed to every hundred birds, and is mixed with the liver. Quantity of dry mash used per day for a pen of six birds, light breeds, is 12 ozs., including minced liver.

2. *Green food.*—Fresh-cut lucerne and silver beet are fed liberally at midday. NOTE.—Everything is fed at a regular hour, and hopper feeding saves labour. It is very noticeable that the birds in the dry mash system of feeding consume more water than those on the wet mash.

It is, therefore, necessary to see that the birds have a plentiful and regular supply of water, which is cool and kept out of the sun.

3. Quantity of grain used per day per pen of six birds, light breeds, dry mashes, 11 to 13 ozs., according to appetite and weather conditions. This grain is fed about 4.30 p.m. every afternoon.

4. *Labour Saving.*—The attention needed in wet and dry mash systems of feeding is certainly in favour of the dry mash. In addition to the saving in time and labour, the birds can have their morning meal as early as they wish, which is not the case always with the wet mash system. If a tired attendant sleeps late the birds suffer in consequence.

5. *Appearance.*—The hens in the dry mash pens appear hardier and tighter in the feather than those in the wet, and in normal weather are

To get Best Results out of Hopper Feeding, Chickens must be reared on Dry Mash.

brighter in appearance, and not affected to the same degree by a cold snap.

6. *Handling.*—The birds fed on dry mash handle better, and are firmer in condition than those fed on wet mash.

7. We should like to call attention here to the number of cases of broodiness in White Leghorns, and would suggest as a remedy that breeders should test their breeding birds for twelve months, and discard any that show any tendency in that direction. Pullets tested for a year would make ideal hens for breeding in the second season, and aid in building up stamina. Breeding from first year's stock has many drawbacks.

FIVE WORLD'S RECORDS ESTABLISHED,

Competition 1914-15.

(1) Twelve Months—Dry Mash.

6 White Leghorns, W. N. O'Mullane, 1,699 eggs.

(2) *Greatest Value of Eggs, Twelve Months.*

6 White Leghorns, W. N. O'Mullane, 141½ Eggs at 1s. 2d per doz. = £8 5s. 2d.

(3) Twelve Months, Heavy Breeds—Wet Mash.

6 Black Orpingtons, J. McAllan, 1,562 eggs.

(4) Four Months' Winter Test, Light Breeds—Wet Mash.

6 White Leghorns, J. H. Gill, 565 eggs.

(5) Four Months' Winter Test, Heavy Breeds—Wet Mash.

6 Black Orpingtons, J. McAllan, 502 eggs.

NOTES.

The leading ten pens in light breeds, wet mash, have an average of 1,527 eggs per pen of six birds.

Average number of eggs per hen (588 birds) throughout the competition, 207.

Total number of eggs laid by 588 birds during twelve months, 121,804; price realized, at 1s. 2d. per dozen, £592 2s. 1d.

The winning pens in each section are as follows:—

1. Light Breeds, Wet Mash ..	Mrs H. Stevenson ..	1,633 Eggs	(White Leghorns)
2. „ „ „ „ ..	E. A. Lawson ..	1,593 „	„	„
3. „ „ „ „ ..	J. H. Gill	1,587 „	„	„
1. Light Breeds, Dry Mash ..	W. N. O'Mullane ..	1,699 Eggs	(White Leghorns)
2. „ „ „ „ ..	E. A. Lawson ..	1,514 „	„	„
3. „ „ „ „ ..	H. Hanbury ..	1,395 „	„	„
1. Heavy Breeds, Wet Mash ..	J. McAllan ..	1,562 Eggs	(Black Orpingtons)
2. „ „ „ „ ..	J. Ogden	1,439 „	„	„
3. „ „ „ „ ..	Marville Poultry Farm	1,373 „	„	„
1. Heavy Breeds, Dry Mash ..	J. McAllan ..	1,210 Eggs	(Black Orpingtons)
2. „ „ „ „ ..	B. Fisher	1,178 „	„	„
3. „ „ „ „ ..	A. Greenhalgh ..	1,168 „	„	„

The winning pens for the greatest total number of eggs laid by a pen during the first four months of the competition (winter test):—

LIGHT BREEDS.

1. White Leghorns ..	J. H. Gill ..	565 Eggs
2. „ „ ..	E. A. Lawson ..	533 „

HEAVY BREEDS.

1. Black Orpingtons ..	J. McAllan ..	502 Eggs
2. „ „ ..	J. Ogden ..	494 „

Heaviest eggs—average weight—Moritz Bros., 2·131 oz.

LIGHT BREEDS—WET MASH.

Owner.	Breed	1914.									1915.				Total.	Position in Competition.
		April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.		
Mrs. H. Stevenson ..	White Leghorns	51	140	122	83	123	153	163	157	156	159	132	143	51	1,633	1
E. A. Lawson ..	,, ..	73	137	130	124	154	147	169	143	159	137	122	80	18	1,593	2
J. H. Gill ..	,, ..	61	151	147	139	142	145	162	146	150	139	107	79	19	1,587	3
R. Hay ..	,, ..	64	129	123	125	133	132	135	135	147	134	116	118	36	1,527	4
A. R. Simon ..	,, ..	56	121	100	135	141	139	148	143	149	132	100	115	42	1,521	5
J. J. West ..	,, ..	79	140	100	119	147	138	137	125	148	126	102	115	26	1,502	6
F. Doldissen ..	,, ..	52	126	114	87	144	135	152	132	140	142	120	108	34	1,486	7
J. Schwabb ..	,, ..	25	118	131	116	137	144	144	109	135	133	122	124	40	1,478	8
C. J. Jackson ..	,, ..	42	108	88	88	135	136	154	152	156	144	132	105	37	1,477	9
Marville Poultry Farm	,, ..	61	114	88	113	115	135	154	135	147	146	125	111	31	1,475	10
W. G. Osburne ..	,, ..	40	101	105	110	144	144	152	145	133	130	118	104	28	1,454	11
F. W. Brine ..	,, ..	22	72	84	101	123	143	153	147	161	117	112	129	49	1,413	12
H. C. Brock ..	,, ..	57	134	105	95	106	136	143	134	141	138	112	79	17	1,397	13
S. Brown ..	,, ..	48	117	129	106	121	140	126	140	127	131	109	92	9	1,305	14
V. Little ..	,, ..	31	99	124	113	132	140	137	132	138	125	104	97	19	1,391	15
S. Buscumb ..	,, ..	53	86	94	113	115	134	144	136	143	130	124	102	14	1,388	16
Giddy and Son ..	,, ..	37	107	119	88	126	138	151	149	151	140	104	64	6	1,380	17
G. W. Robbins ..	,, ..	24	73	103	102	121	127	144	138	139	139	113	113	41	1,377	18
A. W. Hall ..	,, ..	19	53	73	87	124	138	145	146	154	152	134	128	12	1,365	19
B. Mitchell ..	,, ..	37	103	51	73	136	135	150	124	140	143	128	118	25	1,363	20
W. G. Swift ..	,, ..	16	83	93	123	129	132	136	130	136	134	112	102	37	1,363	
E. Waldon ..	,, ..	2	82	107	109	137	144	155	128	128	126	120	92	30	1,360	22
F. C. Western ..	,, ..	..	18	90	124	132	141	155	118	136	150	119	116	26	1,325	23
F. G. O'Bree ..	,, ..	42	87	87	78	126	142	154	127	151	133	109	69	..	1,305	24
W. Tatterson ..	,, ..	42	109	98	115	137	135	144	130	121	112	99	61	1	1,304	25
C. R. Jones ..	,, ..	37	69	69	87	116	132	141	143	133	125	110	89	34	1,285	26

LIGHT BREEDS—WET MASH—*continued.*

Owner.	Breed.	1914.									1915.				Total.	Position in Competition.
		April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.		
A. H. Mould ..	White Leghorns	33	100	121	100	112	131	138	88	121	116	86	104	26	1,276	27
T. A. Pettigrove ..	,, ..	57	127	104	98	111	112	128	89	101	107	105	100	25	1,264	28
Gleadell Bros. ..	,, ..	13	56	90	94	102	126	146	125	130	133	112	101	32	1,260	29
A. Mowatt ..	,, ..	14	26	29	92	135	142	145	141	144	128	115	109	39	1,259	30
A. Ross ..	,, ..	48	111	103	122	133	128	133	128	115	98	76	45	8	1,248	31
C. Pyke ..	,, ..	35	85	81	80	123	131	145	143	135	109	87	69	20	1,243	32
H. Hanbury ..	,, ..	10	76	119	108	113	122	116	114	130	109	101	86	33	1,237	33
W. A. Rennie ..	,, ..	24	98	103	95	118	129	130	123	122	124	74	78	18	1,236	34
Doncaster Poultry Farm	,, ..	21	29	45	84	117	134	155	146	143	144	95	101	20	1,234	35
Bennett and Chapman	,, ..	15	58	110	98	132	126	126	115	145	148	100	48	9	1,230	36
Utility Poultry Farm	,, ..	28	96	103	83	121	130	147	128	123	116	75	57	21	1,228	37
J. C. Armstrong ..	,, ..	38	73	76	101	116	140	148	116	138	111	107	55	5	1,224	38
G. Hayman ..	,, ..	38	42	105	74	88	141	157	146	139	125	101	55	9	1,220	39
All Lay Poultry Farm	,, ..	34	74	44	49	134	133	152	131	131	131	120	66	8	1,207	40
G. Mayberry ..	,, ..	15	38	60	64	109	118	139	132	144	142	119	106	16	1,202	41
E. W. Hippe ..	,, ..	30	73	55	67	142	134	141	128	127	124	88	55	18	1,182	42
R. L. Appleford ..	,, ..	23	35	42	50	97	132	144	142	141	138	118	71	18	1,151	43
E. H. Bridge ..	,, ..	37	81	63	51	93	129	144	133	140	123	98	25	9	1,126	44
R. A. Lewis ..	,, ..	17	55	61	99	93	129	129	111	117	121	116	65	10	1,123	45
A. Boer ..	,, ..	43	62	34	55	112	131	122	106	122	117	103	91	19	1,117	46
F. G. Silbereison ..	,, ..	14	28	35	36	100	132	135	129	142	132	116	80	31	1,110	47
B. Cohen ..	,, ..	16	41	16	35	87	114	118	133	144	144	116	101	20	1,085	48
C. L. Sharman ..	,, ..	26	36	16	28	124	123	114	110	127	134	113	90	36	1,077	49
W. M. Bayles ..	,, ..	3	13	87	58	92	109	120	121	116	115	107	89	34	1,064	50
		1,703	4,190	4,376	4,574	6,100	6,681	7,120	6,522	6,856	6,506	5,453	4,500	1,166	65,747	

LIGHT BREEDS—DRY MASH.

Owner.	Breed.	1914.									1915.				Total.	Position in Competition.
		April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.		
W. N. O'Mullane ..	White Leghorns	52	136	117	150	152	151	170	163	147	149	139	126	47	1,699	1
E. A. Lawson ..	,, ..	50	120	134	134	154	150	156	149	140	135	103	65	24	1,514	2
H. Hunbury ..	,, ..	21	54	95	131	143	149	143	117	145	139	122	102	34	1,395	3
Moritz Bros. ..	,, ..	19	117	105	77	134	144	158	128	151	132	131	81	17	1,394	4
C. Lawson ..	,, ..	52	122	109	113	131	137	146	120	113	117	96	65	10	1,331	5
W. G. Osburne ..	,, ..	24	96	136	146	148	139	137	124	123	94	66	70	27	1,330	6
F. G. Silbereisen ..	,, ..	48	41	18	33	134	158	162	153	160	140	111	94	12	1,264	7
Hunslow Bros. ..	,, ..	8	70	88	108	134	121	145	133	120	110	103	82	32	1,254	8
Miss L. Stewart ..	,, ..	57	114	97	95	138	128	141	118	114	119	73	41	11	1,246	9
A. Greenhalgh ..	,, ..	13	112	77	43	93	134	147	133	141	136	109	77	19	1,234	10
E. W. Hippo ..	,, ..	33	100	101	78	68	114	140	139	135	134	103	71	15	1,231	11
C. J. Beatty ..	,, ..	39	76	62	58	99	134	133	116	130	131	115	91	23	1,207	12
W. H. Robbins ..	,, ..	17	28	62	106	130	142	136	128	122	120	104	86	25	1,206	13
J. Jackson ..	,, ..	25	67	98	53	90	129	130	123	125	117	97	104	22	1,180	14
E. A. Carne ..	,, ..	46	60	29	60	134	148	140	129	121	115	96	83	4	1,165	15
Myola Poultry Farm	,, ..	18	25	56	93	137	146	148	143	121	116	89	46	8	1,146	16
W. M. Bayles ..	,, ..	10	27	71	99	117	112	128	112	137	144	92	74	19	1,142	17
G. Carter ..	,, ..	2	21	73	96	118	147	155	135	119	112	87	39	..	1,104	18
S. Brown ..	,, ..	20	5	30	54	65	107	118	90	105	96	85	76	28	879	19
		554	1,391	1,558	1,727	2,319	2,590	2,733	2,453	2,469	2,356	1,921	1,473	377	23,921	

HEAVY BREEDS—WET MASH.

Owner.	Breed.	1914. April.	May.	June.	July.	August.	September.	October.	November.	December.	1915. January.	February.	March.	April.	Total.	Position in Competition.
J. McAllan ..	Black Orpingtons	62	118	137	121	145	152	145	118	139	143	112	121	49	1,562	1
J. Ogden ..	,, ..	41	121	130	139	138	135	129	99	123	122	98	107	57	1,439	2
Marville Poultry Farm	,, ..	25	70	117	155	160	149	142	117	114	94	88	96	46	1,373	3
H. H. Pump ..	,, ..	29	115	112	132	135	148	141	99	137	104	96	73	16	1,337	4
A. Douglas ..	,, ..	48	63	35	80	132	143	138	130	139	130	122	96	36	1,292	5
J. Mulgrove ..	Rhode Island Reds	60	95	111	124	129	136	121	88	115	92	93	80	30	1,274	6
D. Fisher ..	Black Orpingtons	63	113	127	104	144	115	101	95	88	97	89	92	33	1,261	7
W. P. Eckermann ..	,, ..	17	80	114	132	108	125	116	105	121	114	98	67	23	1,220	8
J. H. Wright ..	,, ..	42	132	97	101	146	138	116	90	86	87	77	74	20	1,206	9
J. A. McKinnon ..	,, ..	35	56	55	86	132	138	128	108	110	117	105	93	38	1,201	10
T. W. Coto ..	,, ..	31	85	114	69	134	122	100	99	101	112	85	101	46	1,199	11
Fairdeal Poultry Farm	,, ..	33	84	84	91	138	122	125	107	103	115	76	82	22	1,182	12
S. Brown ..	,, ..	23	87	87	109	130	125	112	91	94	101	92	57	23	1,131	13
Cowan Bros ..	,, ..	14	79	81	133	118	92	94	78	86	79	68	73	11	1,006	14
J. C. Mickelburgh ..	Golden Wyandottes	9	33	86	74	116	101	98	64	82	77	54	96	46	936	15
Bennett and Chapman	Barred Plymouth Rocks	..	5	43	92	60	120	97	74	92	100	57	86	32	858	16
Jorgen Anderson ..	Red Sussex ..	41	103	57	62	96	76	67	56	74	67	70	74	12	855	17
W. G. Swift ..	Buff Wyandottes	6	61	55	44	58	62	52	43	56	64	59	58	24	642	18
		579	1,500	1,642	1,848	2,219	2,199	2,022	1,661	1,860	1,815	1,539	1,526	564	20,974	

HEAVY BREEDS—DRY MASH.

Owner.	Breed.	1914.									1915.				Total.	Position in Competition.
		April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.		
J. McAllan	Black Orpingtons	9	80	94	96	134	126	127	87	111	77	100	124	45	1,210	1
D. Fisher ..	,, ..	58	124	77	113	136	122	109	88	105	87	59	73	27	1,178	2
A. Greenhalgh ..	,, ..	37	119	101	63	85	127	128	92	107	100	84	86	39	1,168	3
J. H. Wright ..	,, ..	10	35	65	144	139	152	133	93	110	92	87	56	26	1,142	4
C. E. Graham ..	,, ..	34	34	73	69	145	110	136	75	98	93	89	84	33	1,073	5
Myola Poultry Farm	Rhode Island Reds	9	4	52	134	112	134	107	91	110	90	94	77	20	1,034	6
T. W. Coto ..	Black Orpingtons	47	120	105	78	119	82	102	72	76	71	59	77	26	1,034	
Fairdeal Poultry Farm	,, ..	25	36	41	72	115	124	123	93	99	95	75	73	45	1,016	8
Myola Poultry Farm	,, ..	4	2	48	117	117	108	115	88	91	95	72	44	20	921	9
Mrs. G. R. Bald ..	White Plymouth Rocks	..	..	26	45	94	123	127	71	95	103	81	55	24	844	10
C. L. Hewitt ..	,, ..	..	9	22	20	24	83	87	69	82	52	49	41	4	542	11
		233	563	704	951	1,220	1,291	1,294	919	1,084	955	849	790	309	11,162	

Past Records.

HELD UNDER GOVERNMENT SUPERVISION.

For Six Pullets in Twelve Months.

South Australia.—Highest record (White Leghorns), 1,589, R. Walsh, Victoria.

Western Australia.—Highest record, 1,564, A. H. Padman, South Australia.

New South Wales.—Highest record, 1,541, S. Champion, New South Wales.

Queensland.—Highest record, 1,564, Moritz Brothers, South Australia.

Victoria.—Highest record, 1,699, W. N. O'Mullane, Victoria.

Victoria.—Highest record previously, 1,667, J. H. Gill, Victoria.

New Zealand.—Highest record, 1,632, W. A. Nixon, New Zealand.

Victoria.—Highest record (Black Orpingtons), 1,562, J. McAllan, Victoria.

AMORTIZATION.

This is a term well understood in financial circles, but not generally by people who are not engaged in financial transactions. Briefly explained, it is a scheme for paying a debt in small instalments. For example, if a man should borrow £400 at 6 per cent. interest, and agree to pay £28 a year until it was paid up, it is clear that interest for the first year would be £24, and he would pay £4 on the principal. The second year the interest would be slightly reduced, and the amount paid on the principal would be a little larger; and the end of about thirty-four years the entire debt would be paid off.

SERICULTURE.

Young seedling plants of the White Mulberry Tree have been imported by the Department from France and may be obtained by the Public at the rate of one penny each for small quantities or 7s. 6d. per 100. Application should be made to the Principal, School of Horticulture, Burnley.

EXPERIMENTS IN THE CULTIVATION OF POTATOES, 1914-15.

By J. T. Ramsay, Potato Expert.

The results of experiments in potato cultivation carried out by the Department during the season 1914-15 are herewith presented.

These trials were conducted on two separate areas—one at the Government Nursery, Bamawm, and the other at the Labour Colony, Leongatha.

BAMAWM AREA.

The Bamawm plot was grown under irrigation, and the object aimed at in carrying out the trials was to test—

(1) The difference resulting from the application of various manures.
(2) The comparative values of immature and ripe tubers for seed.
(3) The merits of cut and uncut seed.
(4) Whether spring planting or autumn planting of potatoes in the irrigation districts was most profitable.

The plot was planted late in July, 1914, and harvested early in January, 1915. Owing to the lack of water for irrigation, the autumn crop test was for this season abandoned.

The following were the results obtained:—

RIPE SEED PLANTED WHOLE.

	Large.	Small.	Total Weight.
	Yield per acre.	Yield per acre.	Yield per acre.
	Tons cwt. lbs.	Tons cwt. lbs.	Tons cwt. lbs.
No manure	2 0 110	1 8 104	3 9 102
2 cwt. Super.	1 3 84	1 6 58	3 0 30
2 cwt. Super. .. 1 „ S. Potash 1 „ S. Ammonia	3 17 6	1 13 84	5 10 100

RIPE SEED CUT.

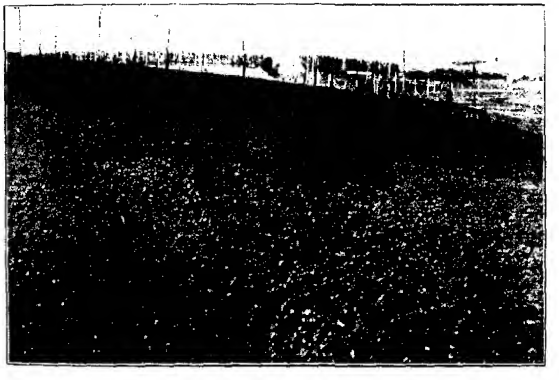
	Large.	Small.	Total Weight.
	Yield per acre.	Yield per acre.	Yield per acre.
	Tons cwt. lbs.	Tons cwt. lbs.	Tons cwt. lbs.
No manure	1 8 104	0 19 32	2 8 24
2 cwt. Super	0 9 72	0 7 26	0 16 98
2 cwt. Super. .. 1 „ S. Potash 1 „ S. Ammonia	1 18 64	1 1 78	2 0 30

IMMATURE SEED PLANTED WHOLE.

	Large.	Small.	Total.
	Yield per acre.	Yield per acre.	Yield per acre.
	Tons cwt. lbs.	Tons cwt. lbs.	Tons cwt. lbs.
No manure	3 19 62	0 16 98	4 16 48
2 cwt. Super.	4 4 42	0 16 98	5 1 28
2 cwt. Super. ..			
1 „ S. Potash	5 6 8	1 140	6 15 0
1 „ S. Ammonia			

IMMATURE SEED CUT.

	Large.	Small.	Total.
	Yield per acre.	Yield per acre.	Yield per acre.
	Tons cwt. lbs.	Tons cwt. lbs.	Tons cwt. lbs.
No manure	2 17 96	0 14 52	3 12 36
2 cwt. Super.	2 17 96	0 12 6	3 9 102
2 cwt. Super. ..			
1 „ S. Potash	6 0 60	1 4 12	7 4 72
1 „ S. Ammonia			



View of Experimental Area, Leongatha.

AVERAGE RETURNS PER ACRE OF THE DIFFERENT CLASSES OF SEED UNDER ALL MANURES.

	Tons cwt. lbs.
Ripe seed whole	4 0 40
Ripe seed cut	1 15 13
Immature seed whole	5 10 100
Immature seed cut	4 15 70

From these figures it will be seen that immature seed proved considerably better than ripe seed in this test. Whole seed in both cases yielded better results than that which was cut, but in this connexion the dryness of the ground at the time of planting, no doubt, had considerable influence.

Regarding the manuring, superphosphate, when applied alone, in the case of plots 1 and 2, only succeeded in reducing the yield, but in all cases where the complete manure was applied a marked increase resulted. Even the least of these increases, viz., plot 1, 10½ cwt. over the unmanured section, more than paid for the cost of the manure, while in plot 4 the full manure was responsible for an increased yield of over 3 tons per acre.

Leongatha Area.

The objects aimed at in conducting this series of experiments were as follows:—

(1) The relative values of mature and immature potatoes for seed purposes, both with and without manures being used.
(2) The effect of dipping seed potatoes in an antiseptic solution (*a*) as a preventive of scab, and as to (*b*) its effect on the yield per acre.
(3) The effect of spraying the growing crop (*a*) as a preventive of blight, and (*b*) the effect on the yield per acre.
(4) The effect on the crop of phosphatic potassic and nitrogenuous manures, singly and in combination.
(5) The prolificacy of different varieties.
(6) The prolificacy of seedlings propagated by Dr. Wilson, of St. Andrews, Scotland, grown here for the third season.

The soil on this area is a friable chocolate loam, well drained naturally, the physical character of which is well suited to the requirements of the potato crop, and is typical of a large area of country in the south-eastern portion of the State.

Samples were submitted to the chemist of the Department for analysis, who reported the following:—

Report on sample of soil and sub-soil from Leongatha Labour Colony—

	Soil, 7"–8".	Sub-soil, 7"–8".	A good soil should contain—
	Parts per 100,000.		
Nitrogen ..	280	126	150
Phosphoric acid ..	86	60	150
Potash	124	101	250
Lime	430	232	500
Magnesia ..	344	237	Not more than lime
Chlorine	9	6	Not more than 35
Reaction ..	Slightly acid	Slightly acid	Neutral

Colour of soil—dark chocolate clay loam of a fairly friable consistency.

This is a soil of a good quality, and compares favorably with what a good soil may be expected to contain in the essential elements of plant food – nitrogen and lime being good, phosphoric acid and potash moderate, and chlorine normal.

(Sgd.) P. RANKIN SCOTT,
Chemist for Agriculture.

The land was ploughed to a depth of 6 inches, and worked up to a good tilth with disc and spike-tooth harrows prior to planting. The seed was planted by hand between 12-19th October, 1914, during good weather conditions, the land being harrowed as soon as possible after planting. Subsequent cultivation with harrows, horse-hoe, and hiller were given as required, to keep the land clean and in a good state of tilth.

The season proved to be one of the driest on record. The average rainfall for this district during the months October to February inclusive is about 12 inches, but during the past season a good fall during the month of December was the only rain which did any material good to the crop; indeed, but for that timely fall the crop would probably not have been worth digging.

The prevailing weather during the growing period was an almost unbroken sequence of hot, dry days and nights. Hot winds following on what showers of rain fell caused very rapid evaporation, and made

Dipping Potato Seed, Leongatha.

the conditions, as far as moisture in the soil was concerned, very uncongenial for the crop, with the result that yields all through the tests were much lighter than was expected.

I.—IMMATURE AND RIPE SEED—MANURED AND NOT MANURED.

The two classes of seed used in this test was obtained from the same crop. The immature seed was secured before the crop had died down, selected and stored in seed potato boxes until planting time. The ripe seed was secured after the crop had died down, and treated in the manner commonly practised, viz., it was placed in a heap in a shed and covered with straw. Manurial and cultural treatments were in the case of both classes of seed exactly similar. The resulting crops showed a marked difference from their appearance through the ground to the harvesting, that grown from immature seed always being much more vigorous. The illustrations shown herewith bearing on this test were

obtained in January, about three months after planting. From these it will be seen that the crop grown from immature seed gave promise of better returns, and the accompanying tables show that the promise was fulfilled at harvest. In the sections manured, the manure used was—2 cwt. superphosphate, 1½ cwt. sulphate of potash, 1 cwt. sulphate of ammonia, and 1 cwt. Thomas phosphate. For simplicity of illustration, the value of the crop, large and small, is taken at £4 per ton, which is not far from the average price of this season.

Attention is drawn to the fact that in both cases, *i.e.*, manured and unmanured, the immature seed produced a greater percentage of marketable sized tubers, in addition to yielding a greater weight per acre than did ripe seed in either case, thus demonstrating the superiority of immature seed over ripe seed.

Class of Seed.	Large.	Small.	Total.	Value per acre at £4 per ton
	Yield per acre.			
	T. c. lbs.	T. c. lbs.	T. c. lbs.	£ s. d.
Immature manured	7 15 0	0 17 56	8 12 56	33 18 0
Immature, not manured	3 15 0	1 5 0	5 0 0	20 0 0
Increase due to manure	..	..	3 12 56	13 18 0
Cost of manure	£2 8 0 per acre			
Net return from use of manure ..	£11 10 0 per acre			
Ripe, manured	4 5 0	1 7 56	5 12 56	21 18 0
Ripe, not manured	2 2 56	1 5 0	3 7 56	13 10 0
Increase due to manure	..	..	2 5 0	9 0 0
Cost of manure	£2 8 0 per acre			
Net return from use of manure ..	£6 12 0 per acre			
Immature, manured	7 15 0	0 15 56	8 12 56	33 18 0
Ripe, manured	4 5 0	1 7 56	5 12 56	21 18 0
Increase due to immature seed ..	..	..	3 0 0	12 0 0
Immature, not manured	3 15 0	1 5 0	5 0 0	20 0 0
Ripe, not manured	2 2 56	1 5 0	3 7 56	13 10 0
Increase due to immature seed ..	..	..	1 12 56	6 10 0

II. AND III.—DIPPING AND SPRAYING TEST.

The object of this test was to get an estimate of the value of dipping seed and spraying the crop (1) for the prevention of disease, and (2) as a means of increasing the yield.

Two varieties of potatoes were used, viz., Sutton's Abundance and Factors. These were subjected to the various treatments of dipping and spraying, and were in each case planted without manures.

The dipped lots were immersed in a solution of corrosive sublimate (1 oz. to 6 gallons of water) for two hours. The sprayed lots were sprayed, on 20th January, with a solution of copper sulphate and washing soda, in the proportions of 2 lbs. copper sulphate, 2½ lbs. washing soda to 10 gallons of water.

The following weights were obtained from the different treatments:—

	Tons.	cwt.	lbs.
Factors, dipped only	4	10	0
Sutton's Abundance, dipped only	5	15	0
Factors, untreated	3	12	56
Sutton's Abundance, untreated	4	5	0
Factors, sprayed only	5	5	0
Sutton's Abundance, sprayed only	5	15	0
Factors, dipped and sprayed	4	17	56
Sutton's Abundance, dipped and sprayed	5	5	0

The tubers produced under all of these treatments were practically free from scab, except that caused by eel worm, which is not affected by dipping.

The dryness of the season was unfavorable for the development of blight, and the crop was free from damage from this cause. Owing to the fact that both treated and untreated lots produced clean tubers (excepting eel worm blister), no conclusions can be taken from this year's

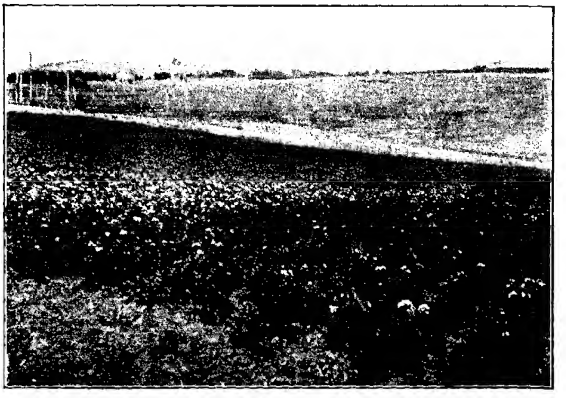
Planting Seed at Leongatha.

experiments as to the effectiveness of the dipping and spraying as disease preventives. It is worthy of mention that at the commencement of the season there was a marked difference in the growth of the plots in favour of the untreated seed, and yet, notwithstanding the fact that diseases caused no apparent damage, the yield from the untreated plot was exceeded by each of the three plots which were subjected to dipping only, spraying only, and dipping and spraying together.

IV. AND V.—MANURIAL AND VARIETY TESTS.

In this test the result of seventeen varieties grown under nine different manurial treatments were obtained. The dry season, as before mentioned, had a most harmful effect on the growth of these plots, and, with that in mind, it is most interesting to find that the most liberal manuring still yielded the best results, judged both from the points of view of weight of crop returned per acre and that of profit resulting from capital expended on supplying manures.

In criticising the performances of the different varieties, it must be borne in mind that as seed for these plots had to be obtained from



Crops from Immature and Ripe Seed growing at Leongatha. Note stronger growth of Immature Seed in background.
Photo by courtesy of the *Australasian.*]

various sources last seeding season, the difference in the yields of different varieties is certainly not entirely due to the difference between these varieties as croppers, but is accounted for in large measure to the

Evidence in the Growing Crop of the benefit of using Immature Seed (on the left).
by courtesy of the *Australasian.*]

treatment which the varieties have been subjected to in previous years. This may be more clearly expressed by saying that, in my opinion, it is

unfair to secure a number of varieties from a number of growers and judge their prolificacy on their performance during the first year of their being tested together, as there is bound to be a varying degree of virility in seed parcels so obtained, due to, amongst other things, the treatment meted out to them in previous seasons and to their suitability to their soil and climatic environment.

Next season's results from these varieties will be a much truer indication of their values as croppers.

The results from the manures, however, may be regarded as worthy of building on, as these are supported by the findings of many experiments.

The table of results is given hereunder:—

	1 A.P.S.B.			2 A.P.S.			3 A.P.			4 A.			5 Nil.			6 P.S.B.			7 P.			8 S.B.			9 S.		
	T.	c.	lbs.	T.	c.	lbs.	T.	c.	lbs.	T.	c.	lbs.	T.	c.	lbs.	T.	c.	lbs.	T.	c.	lbs.	T.	c.	lbs.	T.	c.	lbs.
Factors	5	6	42	6	0	28	3	0	14	3	18	70	3	0	14	4	12	56	2	15	56	1	7	84	1	12	42
Beauty of Hebron	3	0	14	1	17	0	2	1	70	2	1	70	0	9	28	2	1	70	1	3	14	0	13	28	0	9	28
Vermont ..	5	15	70	4	7	98	2	10	98	1	12	42	1	17	0	4	12	56	2	1	70	1	3	14	1	3	14
Brown River ..	3	9	42	4	12	56	2	6	28	2	10	98	1	17	0	2	15	56	1	7	84	3	4	84	1	12	42
Beese's Prolific ..	6	0	28	5	15	70	2	10	98	1	17	0	2	10	98	4	7	98	2	6	28	3	4	84	1	12	42
Black Prince ..	5	15	70	4	12	56	4	3	28	2	15	56	1	3	14	3	4	24	2	15	56	2	6	28	2	6	28
Green Mountain ..	4	12	56	4	3	28	1	7	84	1	12	42	0	18	56	3	9	42	1	7	84	2	15	56	1	17	0
Brownell's Beauty	2	15	56	3	0	14	2	1	70	2	6	28	1	12	42	4	17	14	1	17	0	2	15	56	2	10	98
Peach Bloom ..	3	14	0	5	6	42	2	6	28	2	1	70	0	18	56	2	1	70	2	10	98	2	10	98	1	12	42
Gold Coin ..	3	18	70	2	15	56	3	0	42	2	6	28	1	3	14	4	7	98	4	12	56	3	18	70	4	3	28
Cleopatra ..	2	15	56	1	17	0	1	12	42	1	7	84	0	14	98	1	3	14	3	3	14	3	9	42	1	12	42
Queen Valley ..	5	6	42	3	18	70	1	12	42	1	17	0	1	17	0	2	15	56	3	0	14	1	17	0	1	7	84
Scruffe	4	3	28	2	6	28	1	3	14	1	7	84	1	3	14	2	1	70	1	3	14	1	12	42	1	7	84
Carman III. ..	5	11	0	4	3	28	4	7	98	3	14	0	2	1	46	2	10	98	4	7	98	2	10	98	4	3	28
Snowflake ..	3	14	0	1	17	0	1	3	14	1	7	84	0	18	56	1	7	84	2	1	70	1	3	14	1	3	14
Coronation ..	5	1	84	3	14	0	3	14	0	3	14	0	3	4	84	3	9	42	3	4	84	5	1	84	2	6	28
Scottish Triumph	2	15	56	2	15	56	2	6	28	2	10	98	1	7	84	2	10	98	1	17	0	2	1	70	1	3	14
Averages ..	**4**	**6**	**88**	**3**	**14**	**30**	**2**	**9**	**27**	**2**	**5**	**109**	**1**	**11**	**60**	**3**	**1**	**81**	**2**	**8**	**108**	**2**	**9**	**23**	**1**	**17**	**91**
Average increased weights due to manures ..	2	15	28	2	2	82	0	17	79	0	14	49	Check.			1	10	21	0	17	48	0	17	75	0	6	31
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Value of average of crops at £4 per ton	17	7	0	14	17	0	9	17	0	9	4	0	6	6	0	12	7	0	9	16	0	9	17	0	7	12	0
Average cash value increase per acre	11	1	0	8	11	0	3	11	0	2	18	0	..			6	1	0	3	10	0	3	11	0	1	6	0
Cost of manures per acre	**2**	**8**	**0**	**2**	**5**	**0**	**1**	**16**	**0**	**0**	**15**	**0**	..			**1**	**13**	**6**	**1**	**1**	**0**	**0**	**12**	**6**	**0**	**8**	**6**
Net average return from manuring	**8**	**13**	**0**	**6**	**13**	**0**	**1**	**15**	**0**	**2**	**3**	**0**	..			**4**	**8**	**6**	**2**	**9**	**0**	**2**	**18**	**6**	**0**	**17**	**6**
Approximate cost per ton increase of various manures ..	0	17	6	1	1	0	2	0	0	1	0	8	..			1	2	4	1	4	0	0	14	1	1	7	2

* Rate of application of manures:—A.—S. Ammonia, 1 cwt. per acre.; P.—S. Potash, 1½ cwt. per acre.; S. Superphosphate, 2 cwt. per acre; B.—Thomas Phosphate, 1 cwt. per acre.

The result of the foregoing experiment has been reduced to a cash basis for the purpose of demonstrating the money value to the grower of liberal manuring. While it is not contended for one moment that the most profitable rate of mixing or of application of manures has been given in any one of these sections, it is contended that, notwithstanding the dryness of the season (a factor which, no doubt, operated against the manured sections more adversely than it did against the unmanured check plot) the liberal application of manures is a

decidedly profitable investment clearly demonstrated here. Much might be written of this, but the growers' study of it will be infinitely more profitable to him. Therefore, it is presented without further comment.

VI.—SEEDLINGS.

For the third season a number of varieties produced from seed presented by Dr. Wilson, of St. Andrew's University, Scotland, were tested. The results from these during the two previous years have been very gratifying. In October last these were planted side by side with local sorts at Leongatha, and again their performance has proved quite a number of them to be of such merit as to warrant their further cultivation. Fully thirty of these seedlings produced tubers at rates varying from 4 tons to 9 tons per acre under soil and seasonal conditions in which the best average of seventeen locally-grown sorts was 4 tons 6 cwt. The desirability of the further cultivation of these, therefore, is self-evident.

In conclusion it may be stated that the increased yields obtained from the use of immature seed and the application of liberal quantities of manure were anticipated, and these increased yields fully bear out the advantage of practices in the cultivation of the potato strongly advocated by this Department.

WHEN IS AN ORANGE RIPE?

This is a question which has vexed growers, dealers, consumers, legislators, and food commissioners for a long time. Immense capital is invested in the production of these fruits, and in course of time various abuses have arisen, and have become serious enough to receive much attention. Unscrupulous growers and dealers have sold unripe and immature fruit to unsuspecting buyers, and the practice of "sweating" green oranges to give them a yellow colour on the outside has been indulged in on a large scale. The reason why "sweating" is resorted to is that, apparently, ripe oranges can be sent into the market a few weeks ahead of time in the early part of the season, and those unscrupulous enough to resort to the practice gain an advantage of prices higher than is obtained by the honest grower who has waited for nature to bring her own work to perfection.

Orange growers in certain parts of America are protected by law against "sweating."

The various official attempts to see that the consumer got a good orange did not inform anybody how to tell an immature orange from a ripe one, and as soon as attempts were made to enforce the laws, it developed that there could be a wide difference of opinion as to when an orange was ripe. It was clear that colour was no guide, and as to taste—well, tastes are known to differ.

At length, after a prodigious amount of talk and study, those interested in the orange business have agreed that an orange to be considered ripe should not have more than 1.25 per cent. of acid, calculated as citric. In order to see that the law and the standard are lived up to, inspectors are put into the field, and go about taking samples.—[Extract from article in *Pure Products*, November, 1914.]

STANDARD TEST COWS.

Report for Quarter ending 31st March, 1915.

Considering the severe and protracted nature of the drought covering the period of this report, some diminution in milk yield was to be expected. Owners, particularly those in the northern districts, are undergoing an ordeal in providing substitutes for the natural herbage. Dear fodder is the rule when farmers buy, and the purchase of fodder at prevailing rates implies confidence in the capacity of the stock to which it is to be fed. Happily, this confidence is not lacking in the herd-owners in this test, and generally speaking, a genuine endeavour has been made to meet the season's deficiencies. Despite the high cost of foodstuffs, and the total absence of green feed, the yields generally might have been maintained more successfully had the complete ration been purchasable; but concentrate, without which no ration can be effective for a milking cow, has been either not procurable or procurable only in insufficient quantities. Where the whole of the food—both bulk and concentrate—had to be purchased under these circumstances, it is not surprising that the adverse conditions are reflected in the milk charts.

With regard to the southern districts, the position is more gratifying. Here, where the incidence of the drought was neither so early nor severe, some owners have been able to defeat its effect on the yields at least, by hand feeding. So successfully has this been practised that, in many instances, cows have surpassed their last year's excellent record. This, effected by auxiliary hand-feeding in a season like the present serves to emphasize the fact that pasture alone is not equal to sustaining the milk yield at the maximum, even in normal seasons.

Individual returns are as follow:-

W. WOODMASON, Malvern. (Jersey.)

Completed since last report, 3. Certificated, 3.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Graceful Duchess of Melrose VIII.	1,056	11.4.14	18.4.14	273	25½	8,765	5·77	505·72	250	570½
Jenny Lind VII. of Melrose	3650	15.4.14	22.4.14	273	23	7,877½	5·64	444·57	250	506½
Jessie of Melrose VI.	Not yet allotted	27.4.14	4.6.14	273	21½	7,924½	6·71	532·17	250	606½

F. J. STANSMORE, Pomborneit. (Ayrshire.)

Completed since last report, 15. Certificated, 0.

W. P. BRISBANE, Weerite. (Ayrshire.)

Completed since last report, 15. Certificated, 15.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Blossom of Gowrie Park	2,411	28.3.14	4.4.14	273	27½	10,801½	4·94	523·77	250	597
Patch of Gowrie Park	2,430	28.3.14	4.4.14	273	20½	7,757½	4·93	382·66	250	436½
Chaffinch of Gowrie Park	2,413	3.4.14	10.4.14	273	16½	7,582	5·00	378·83	250	431½
Heather Duchess of Gowrie Park	1,449	3.4.14	10.4.14	273	17½	7,557	4·94	373·47	250	425½
Dolly Varden of Gowrie Park	2,418	8.4.14	15.4.14	273	20	9,027	4·41	398·28	250	454
Linnet of Gowrie Park	2,794	9.4.14	16.4.14	273	19½	7,783	4·61	359·09	175	409½
Lucie of Glen Elgin	2,109	9.4.14	16.4.14	273	15	8,334	5·04	420·19	250	479
Martha of Gowrie Park	2,795	15.4.14	22.4.14	273	13½	6,521	4·88	318·39	175	363
Pretty of Gowrie Park	2,797	16.4.14	23.4.14	273	32½	11,196½	4·42	494·66	250	564
Queen Bee of Gowrie Park	2,798	16.4.14	23.4.14	273	13½	6,800	4·85	330·04	175	376½
Honey of Gowrie Park	2,422	17.4.14	24.4.14	273	23	12,655½	4·41	558·39	250	636½
Ivoline of Gowrie Park	2,793	19.4.14	26.4.14	273	19½	8,564	4·84	414·78	175	472½
Ruby Queen of Gowrie Park	2,800	20.4.14	27.4.14	273	17½	7,174½	4·37	313·64	175	357½
Trixie of Gowrie Park	2,434	20.4.14	27.4.14	273	24½	10,725	4·75	509·32	250	580½
Stella of Gowrie Park	2,801	5.5.14	12.5.14	273	22	9,398	4·75	446·42	175	509

DEPARTMENT OF AGRICULTURE, Werribee. (Red Poll.)

Completed since last report, 11. Certificated, 10.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Phillipina ..	Not yet allotted	24.5.14	31.5.14	273	8½	6,628½	5·04	333·88	200	380½
Atlanta ..	Not yet allotted	25.5.14	1.6.14	*248	18½	5,471	4·73	259·05	250	295½
Cameo ..	Not yet allotted	28.5.14	4.6.14	273	15½	5,235	5·14	269·40	200	307
Connecticut ..	Not yet allotted	2.6.14	9.6.14	254	4½	6,730	4·74	319·05	250	363½
Turka ..	Not yet allotted	3.6.14	10.6.14	273	7½	6,214	4·93	306·71	250	349½
Alpina ..	Not yet allotted	5.6.14	12.6.14	273	14	6,816	3·95	269·04	200	306½
Asiana ..	Not yet allotted	19.6.14	26.6.14	273	5½	5,800	4·91	285·04	250	325
Vuelta ..	Not yet allotted	19.6.14	26.6.14	233	4	7,401½	4·46	330·20	250	376½
Sumatra ..	Not yet allotted	21.6.14	28.6.14	273	9½	8,990	4·67	419·81	250	478½
Netherlana ..	Not yet allotted	23.6.14	30.6.14	273	18	6,612½	4·21	278·23	200	317½

* Sold 25 days before expiration of term.

GEELONG HARBOR TRUST, Marshalltown. (Ayrshire.)

Completed since last report, 10. Certificated, 4.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Ruby of Sparrowvale	2,512	2.4.14	9.4.14	273	15½	5,488½	4·13	226·75	175	258½
Ada VII. of Glen Elgin	1,802	6.4.14	13.4.14	273	15	6,651	4·52	300·54	250	342½
Ruby of Glen Elgin	1,836	14.4.14	21·4.14	273	14½	7,303	4·13	301·44	250	343⅝
Gaiety of Gowrie Park	2,875	1.6.14	8.6·14	273	14½	5,509	4·45	245·35	175	279⅝

C. G. KNIGHT, Cobram. (Jersey.)

Completed since last report, 3. Certificated, 3.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Sweetheart ..	2,987	30.3.14	6.4.14	273	14	4,653½	4·71	219·13	175	249⅛
Doreen	2,982	16.5.14	23.6.14	273	5½	3,548½	5·55	197·14	175	224⅛
Amy Castles ..	1,520	17.5.14	24.6.14	244	5	5,104	5·97	304·53	250	347¼

C. D. LLOYD, Caulfield. (Jersey.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Sparkle	2,978	25.4.14	2.5.14	273	15	5,672½	6·32	358·85	175	409

SADLER BROS., Noorat. (Ayrshire.)

Completed since last report, 3. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Ruby of Burnbrae..	3085	29.4.14	6.5.14	231	4	6,169½	4·11	253·42	250	289

J. D. READ, Springhurst. (Jersey.)

Completed since last report, 6. Certificated, 6.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Snowdrop of Springhurst	3709	8.4.14	15.4.14	273	9½	3,613¾	5·25	189·68	175	216¼
Princess of Springhurst	2,521	16.4.14	23.4.14	273	7½	6,291	5·87	369·11	250	420¾
Graceful Magnet of Springhurst	2,058	22.4.14	29.4.14	273	16	6,506¼	5·21	338·98	250	386¼
Tulip of Springhurst	2,730	23.5.14	30.5.14	273	8	6,099	5·93	361·57	250	412¼
Stockings of Springhurst	2,663	25.5.14	1.6.14	273	7½	6,119½	4·99	305·75	250	348½
Euroa of Springhurst	1,918	16.6.14	23.6.14	256	6	5,743	5·64	323·69	250	369

Miss S. L. ROBINSON, Malvern. (Jersey.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Defenders Claribel..	958	7.6.14	14.6.14	273	5½	5,660¼	5·70	322·80	250	368

D. SADLER, Camperdown. (Ayrshire.)

Completed since last report, 5. Certificated, 5.

Name of Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk last Day of Test	Weight of Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.	lbs.
Pearl of Kilmarnock	3,098	2.5.14	9.5.14	273	10	4,951¼	4·59	227·51	175	259¼
Sunflower of Kilmarnock	3,100	13.5.14	20.5.14	273	5	5,479	4·84	265·42	175	302¾
Get of Kilmarnock	3,092	16.5.14	23.5.14	273	17	6,643	4·12	273·49	175	311¾
Brilliant of Kilmarnock	3,090	17.5.14	24.5.14	273	4	5,338½	4·68	249·75	175	284¼
Spider of Kilmarnock	3,099	21.5.14	28.5.14	273	5	3,924½	4·58	179·76	175	205

THE HORSE'S FOOT AND ITS CARE.

By W. A. N. Robertson, B.V.Sc., Chief Veterinary Officer, Department of Agriculture.

The subject, "The Horse's Foot and its Care," is of great interest and importance to all, for there is hardly a horse-owner in the country who will not agree that the foot is perhaps the most important part of the horse.

Some will not admit this without including the leg; but, as will be seen at a later stage, the legs depend to a considerable extent upon the character of the foot. However, that the animal's usefulness is dependent upon the possession of good feet has long been recognised. Even in colt-hood the feet, if neglected, may become a source of trouble. Many a fine-grown youngster has lost a place in the show ring because of crooked legs, and the majority of these are contracted from neglected feet.

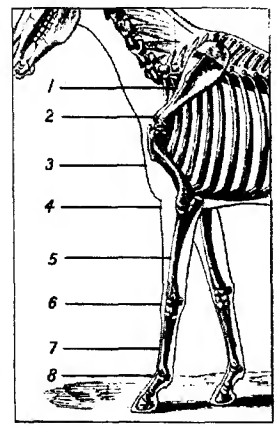


Fig. 1.—(1) Shoulder blade.
(2) Shoulder joint.
(3) Humerus.
(4) Elbow joint.
(5) Forearm.
(6) Knee.
(7) Cannon.
(8) Fetlock.

Before entering into this aspect of the subject, it is necessary that we should know something about the structure of the foot in order that a reason may be assigned to our methods, and that we may fully appreciate the importance of such methods.

The first of the structures which we must consider is the bony skeleton of the limbs, and we will take a fore as an example, avoiding as much as possible all minute anatomical details and scientific technical terms.

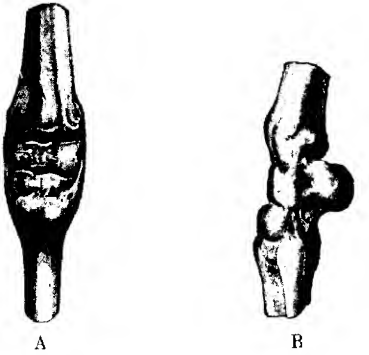
The bones of the foreleg (Fig. 1) commencing at the superior aspect, are:—First, the shoulder blade, bound firmly to the body wall and capable of very little lateral movement. The shoulder joint is formed by the union of this bone with the next below (the humerus). The joint is of a ball and socket variety—that is, the movement of it is in any direction. The lower end of this bone forms, with the heads of the bones of the forearm (the radius and ulna), the elbow joint. The study of this joint (Figs. 1 and 2) will show that the movement is in a backward and forward direction only—that is, it is like a hinge. There is no side movement. The lower end of the forearm forms, with several small bones of the knee proper, the knee joint (Fig. 3), and here again it will be seen that there is practically no outward or inward movement, but the same hinge-like one as present in the elbow.

We come next (Fig. 4) to the cannon bones—1 large, and 2 small, meta-carpals, extending downwards, and forming, with the long pastern bone below (the os suffraginis), the fetlock joint. The lower end of this, in conjunction with the short pastern bone (the os coronæ), forms the pastern joint, and this in joining with the coffin bone (os pedis), along with the navicular bone behind, forms the coffin joint. The movement of these three joints is purely a hinged one in a backward and forward direction.

Fig. 2.—Ligaments of the Elbow Joint—posterior view.

A close knowledge of these structures, and particularly of the movements in them, is, as will be seen later, most important to a clear understanding of why it is necessary to take care of the foot.

Passing now to a consideration of the foot itself, there are numerous structures entering into its formation, and, for convenience, we take them from the visible part—the hoof—to the invisible—the bony skeleton. The hoof is divided into the horny crust or wall, the sole, and frog or foot pad. (Fig. 5.) The wall is divided for convenience into toe, quarters, and heels, at which point it is turned sharply inwards to form the bars; towards the heels the thickness of the wall decreases. This, together with the inflection of the bars, provides a springlike mechanism; the bars also serve the purpose of binding the sole and



A B

Fig. 3 (A).—The knee joint front view.
(B) Side view showing ligaments binding the bones, allowing for backward and forward movement and preventing lateral movement.

wall together. They act as buttresses, preventing the shrinking of the heels; if they are cut away, the heels contract and a narrow foot results. They must, however, have some other function, else it would answer the purpose if the wall were continuous around the whole foot. If

such were the case there would, of course, be no spring in the heels, for they would be incapable of expansion. The main reason, then, for this break in the continuity is to provide a circle of horn capable of opening outwards at the heel (Fig. 6), and this it will be seen, occurs when weight is placed upon the foot.

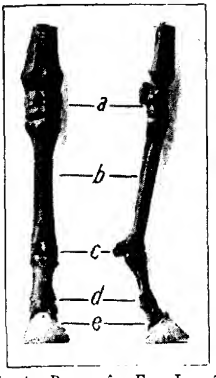


Fig. 4.—Bones of a Fore Leg, front and side view, showing provision for backward and forward movement only. (*a*) Knee joint, (*b*) Cannon bones, (*c*) Fetlock joint, (*d*) Pastern joint, (*e*) Coffin joint.

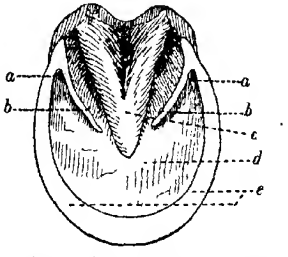


Fig. 5.—Ground Surface of Foot. (*a*) Heels, (*b*) The Bars, (*c*) The Frog, (*d*) The Sole, (*e*) The Wall.

The structure of the wall is fibrous, the fibres running parallel to each other, and with the same obliquity as that presented by the front

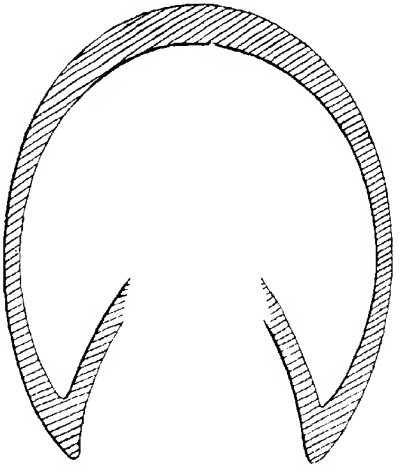


Fig. 6. Transverse section of wall showing bars with frog and sole removed

of the wall. The fibres may be likened to a number of hairs cemented together, which are secreted by small projections found on the coronary

band, which lodges in the groove along the top of the wall. (Fig. 7.) Although the wall varies in thickness from the front to the heels, it does not do so from above downwards. The thickness of the coronet

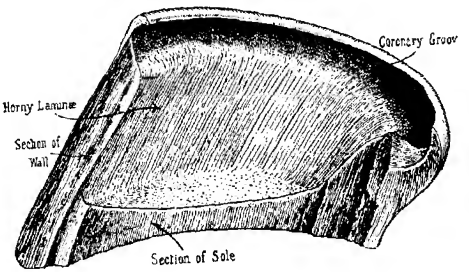


Fig. 7.—Half of a hoof showing the inside.

is the same as at the ground surface. Although apparently a hard, dry structure, a considerable amount of moisture is present in the horn, more particularly in the deeper parts, which is very necessary in maintaining elasticity. Covering the surface of the wall is a thin layer,

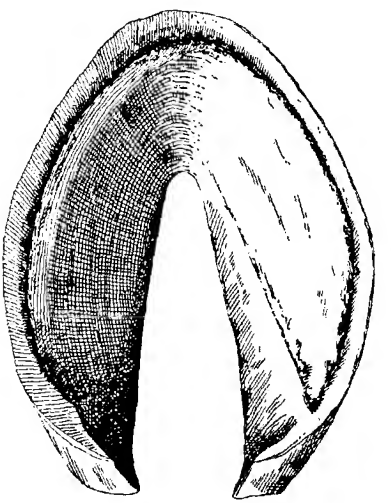


Fig. 8.—The sole with frog removed.

known as the "periople," which resembles a coat of varnish, and its use is to prevent rapid evaporation of moisture, which leads to dry, brittle feet. On this account, it should never be interfered with by

rasping the outside of the hoof. Too much moisture in the horn by standing in wet stalls, &c., is also injurious, leading to various diseases.

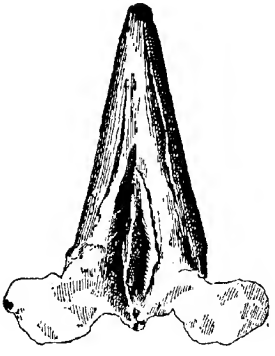


Fig. 9.—The frog detached from the sole.

Upon the inside of the wall is found a large number of thin, long, horny leaves (horny laminæ), running from above downwards. There are from 500 to 600 of these, and their functions will be more carefully studied when dealing with the sensitive foot.

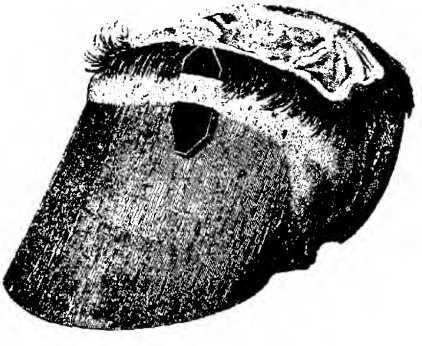


Fig. 10.—The frog band detached from wall by small wedge

The sole is the thin layer of horn forming the floor of the foot (Fig. 8), situate within the lower border of the wall. It is slightly arched, so that its centre does not come in contact with the ground. Posteriorly it is divided by a triangular space, into which the frog

fits. Its inner surface is covered with small pits, which correspond to projections on the sensitive part beneath.

The frog is a peculiar structure of horn, triangular in shape (Fig. 9), and, though situated between the bars, it is only attached at its upper border, leaving a space below which allows for expansion without the pressure being distributed to the whole foot. Under natural conditions the frog is full and large, with considerable elasticity; the bulbs plump and rounded. Too often in the foot of animals that have been shod it is found small and dry and shrivelled. I am glad to say the condition is not nearly so common as it was some years ago, for smiths have learnt that nature intended it to bear on the ground, and not be cut away. It is peculiar that the more wear it gets the better it develops. As will be seen later, it has an important function to perform, due to its elasticity and capability of undergoing compression. Covering the bulbs of the heels there is a thin layer of light-coloured horn, which extends round the upper portion of the wall, and which stands out visibly after the foot has been poulticed. This is known as the "frog-band." (Fig. 10.)

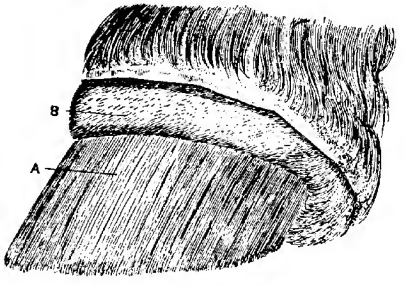


Fig. 11.—Foot with hoof removed showing (A) sensitive laminæ, (B) coronary band.

All that has been described so far is known as the "insensitive" foot. We now come to the structures beneath, known as the "sensitive" foot.

Corresponding to the horny laminæ, we have, covering the wall of the sensitive foot, the same number of delicate leaves, the sensitive laminæ (Fig. 11) between which the horny laminæ dovetail, forming a very close union between the wall and sensitive foot. This assists in supporting the weight of the body, for to a certain extent it may be said that the foot is slung in these laminæ. They are attached by dense tissue to the bones and structure below them, and are plentifully supplied with nerves and blood vessels.

Along the superior border of the sensitive foot, at its junction with the skin, is found a dense band of tissue, the coronary band (Fig. 11), which corresponds to and fits into the groove, already mentioned on the wall. On its surface are numerous projections or papillæ, which fit into depressions in the wall. It is from these papillæ that the horn fibre

grows, whilst the spaces between form the cement substance which connect them all together. It is essential that no injury should be done to this coronary band, for upon its healthy condition depends the soundness of the wall.

The sensitive sole is that portion to which the sole is attached. Its surface is covered with papillæ, from which the horny sole is secreted; it is an exact counterpart of the sole. The sensitive frog is an exact reproduction of the frog, with its cleft and commisures at each side. Except at its point it is not attached to the coffin bone, but to a pad of tissue known as the "Plantar Cushion," or "Frog Pad." It fills up the space between the sensitive frog, the lateral cartilage and the bone. As will be seen later, it is an important part of the foot.

Extending in a backward direction from the wings of the coffin bone, to which they are attached, are found thin plates of cartilage known as the lateral cartilages. They extend above the level of the coronary band, and, as has been pointed out on other occasions, are the structures involved in the formation of sidebones. These cartilages form the basis of the back part of the foot, upon which the wall is moulded. They are covered on the outside by sensitive laminæ, and, being elastic, permit of certain movements in the posterior of the foot. If the whole of the hoof were filled with the coffin bone, there would be a hard unyielding, rigid foot, subject to jar and concussion.

We may now turn to a consideration of the uses of these structures. First, of course, the dense covering is for protection, to prevent injury and bruising of the parts beneath; but if this were the only use, then a complete simple and dense box would answer the purpose. As has been seen, the parts are peculiar in shape and structure, and all go to form, as a matter of fact, a yielding or springlike termination to the leg. No one part of the foot is of greater importance than another. Each is dependent for its soundest condition upon its neighbouring parts, the whole producing sufficient yielding to overcome concussions when the foot comes to the ground. When the foot does come to the ground the following phenomena occur:—The frog, coming in contact with the ground, presses upon the sensitive frog beneath, and this is transmitted in turn to the plantar cushion. The squeezing causes an outward bulge, for at the same time there is a slight descent of the coffin bone, through the coffin joint yielding backwards. This causes a pressing outwards of the lateral cartilages, which, in turn, expand the heels. The whole amount of give is small, but is just sufficient to arrest jarring, and may be likened to the hand giving backwards when catching a ball without inconvenience. If the hand is kept still the concussion is great, and may injure the joints, &c.

That the foot is capable of expansion has been demonstrated frequently by a simple method. A sheet of paper is placed on a flat surface, such as a board. The foot is then placed on this, and close around the wall a pencil is drawn, giving an outline of the hoof. Then the opposite leg is lifted, and again a pencil outline is made. It is then found that when the whole weight is borne by one leg the hoof at the heels has expanded slightly. This is allowed by virtue of its springing character and the bars already referred to. In order to maintain this characteristic it is necessary that the horn shall contain a certain amount

of moisture, and the walls shall come in contact with the ground; also that the frog shall be fully developed. At the same time, there is a slight descent of the coffin bone and a flattening of the sole.

Let us now pass to a consideration of the necessity for care of the feet. Under natural conditions, and in its wild state, the growth of the

Fig. 12.—Showing overgrowth of horn from want of friction.

feet was to a large extent automatically controlled by wear and tear; but under domestication it is found that by leaving them alone they either overgrow, owing to want of friction (which they do not get on soft ground) (Fig. 12), or by excessive wearing on hard ground produce soreness. This latter condition is overcome by shoeing; but it should be borne in mind that the foot is continually growing, and consequently at periodic intervals friction must be supplied by the farrier's rasp to take the place of natural wear and tear, and so keep the hoof within reasonable limits of growth. I will deal with the question of shoeing at a later stage.

Taking the conditions prevalent on most farms, we know it is necessary to trim the feet frequently. Unfortunately, this is not done often enough, and it is a common thing to see feet of all shapes and sizes, and frequently with large portions breaking away from the walls, or split, sometimes almost to the coronet. (Fig. 13.)

Fig. 13.—Showing Irregular Feet, causing "off" fore to turn in and "near" to turn out.

Excessive growth of horn causes disproportion in the foot, and ill-formed feet react injuriously upon the limbs, producing various distortions. The horn, growing as it does, in a forward direction, tends eventually to become too long at the toe, and the centre, upon which the weight is carried, is too far forward from the vertical line of the leg. Overgrowth of wall also tends to lift the frog from the ground, and from disuse this wastes, and contracted feet occur. (Fig. 14.) Portions of the wall breaking away or being removed unevenly cause a twisting

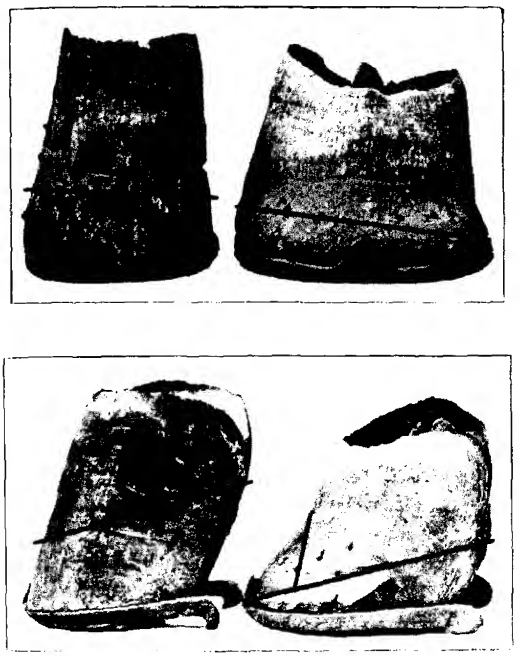


Fig. 14.—Irregular and overgrowth of horn, the black lines show approximately *where the hoof should be cut away to.*

of the legs and distortion, which in young animals is a serious condition, as the bones tend to grow in this form.

In trimming the foot, certain points should always be borne in mind. The angle at which the wall meets the ground varies in different feet, but, as a general rule, it should approximate 50 degrees in the fore feet. (Fig. 15.) If much less the toe is too long; if much more the heels are too high. The bearing surface of the foot, *i.e.*, that part in contact with the ground—should be level. First, so far as the actual surface is

concerned, there should be no excessive reduction at heels or toe. But an even more important feature is that, when looked at from the front, both sides of the wall should be of equal height, thus making a line through the coronet run parallel to the ground surface, and a line to the centre of the limb cut these at right angles. (Fig. 16.)

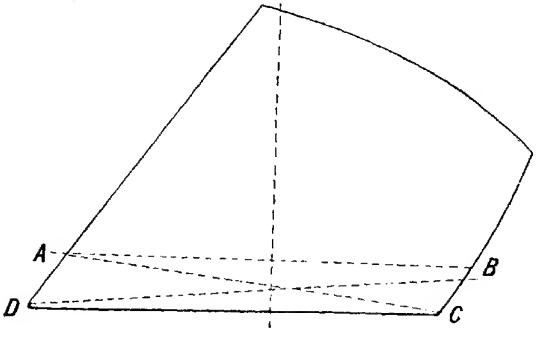


Fig. 15.—Showing correct reduction along line A-B; if along D-B, toe is too long; and if along A-C, heels are too high.

Under such circumstances the foot is properly balanced. If this condition is not present, then the horse is to suffer. If either wall is allowed to be too long the coronet will not be parallel to the ground. This will tend to throw the pastern bones outwards from the vertical line. (Fig. 17.)

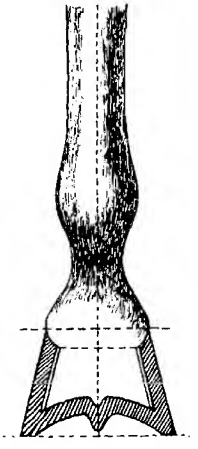


Fig. 16.—Section showing foot with even bearing.

As already explained, the joints of the limb can only move in one direction; consequently the leg has to be twisted to allow them to work. This twisting is carried on as far as the shoulder—the only joint capable of counteracting it by its ball and socket action—and if the inside wall is the higher we find the animal with turned-in toes, knees wide, elbows turned out. (Fig. 18.) If the animal is young and growing, this all tends to produce bent bones or crooked legs in an outward direction. A far worse fault, however, is to allow overgrowth of hoof on the outside. When the reverse to this picture is presented (Fig. 19) toes turned out, fet locks close together, knock-kneed, elbow turned in, pinching the chest—these horses will always be found brushers (Figs. 20, 21), and apart from this, are frequently lame from the strain upon the feet and joints.

Fig. 17.—Showing pastern bones thrown out of perpendicular by artificial raising of outside of hoof.

for there is not the same chance of adjustment of the limb as with the pigeon-toes.

In order to produce the straight action so dear to the heart of all horse lovers, it is essential that all the joints of the leg should bend in a direct forward direction; but this can only be obtained by the horse breaking over the foot at the centre of the toe, any change of point, for so breaking over means that the leg is screwed to enable the joints to bend, and the result is a throwing of the leg from the straight line, and crooked action results. (Fig. 22.) The reaction of the limb to distorted forms of hoof is more serious in the young with growing bones than in the aged with mature tissues, and advantage may be taken of this knowledge to correct defective limbs by altering the vertical line of bones. Thus knock-knees may be corrected by allowing overgrowth inside. A colt with well-forward limbs requires only that his feet should be kept proportionate.

Hocks turned excessively inwards may be counteracted by allowing overgrowth on inside, or *vice versâ*. If overgrowth cannot be provided for, then shoes of suitable thickness may be made.

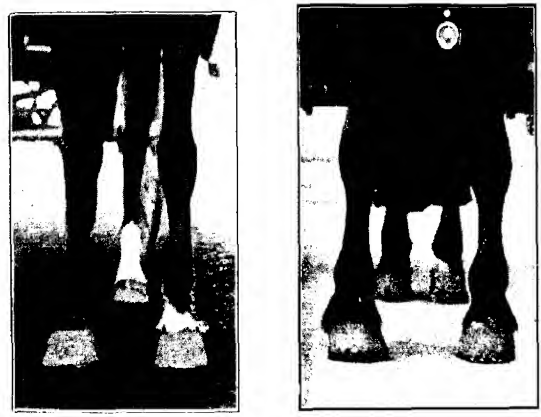


Fig. 18.—Effect of badly balanced feet—toes in, knees and elbows out, wide chest.

In dressing the feet no cutting of the sole or frog is required, as shown in Fig. 23; nature provides for the shedding of superfluous horn All that is required is to lower the wall in the manner already indicated, so that it is level, and the frog is not lifted from the ground (Fig. 24.)

Before concluding, a few words on shoeing will not be out of place. It has frequently been stated that shoeing is a necessary evil; but if

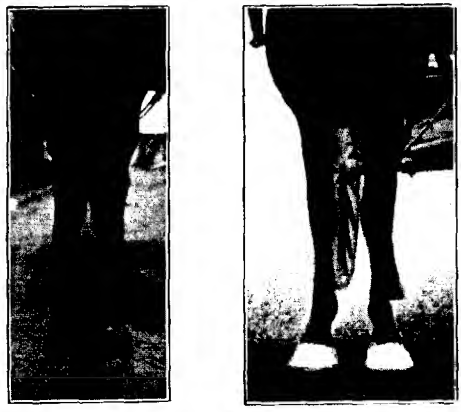


Fig. 19.—Effect of badly balanced feet—toes out, knees and elbows in, pinched chest.

shoes are intelligently made and applied there is no evil in the practice. That evil results do occur is not due to the practice, but to ignorance of the fundamental principles. It should be borne in mind that a shoe under normal conditions is only applied to prevent excessive wear of the wall, and consequent injury and bruising of the sole; therefore it should be as light as possible. A heavy shoe does not always mean a long lasting one, for the iron may be so distributed as to wear quickly. The weight is judged by the amount and class of work required. Further, a heavy shoe requires more nails than a light one, and an excess of nails should be avoided, for they injure the wall and aid evaporation of moisture.

Fig. 20.—Foot of a Brusher. The black line indicates the direction the ground bearing should occupy; so much of the inside wall has been removed that several shoeings would be necessary before the foot could be brought to the correct shape.

So far as width is concerned, no "cover" for the sole is required under normal circumstances. Defective soles may sometimes require

protection, therefore a shoe should be as wide as the natural bearing surface; wider does no harm until it is sufficient to afford lodgment for stones between it and the sole.

Fig. 21.—Hind legs of brusher toes too much turned out from overgrowth of outside wall.

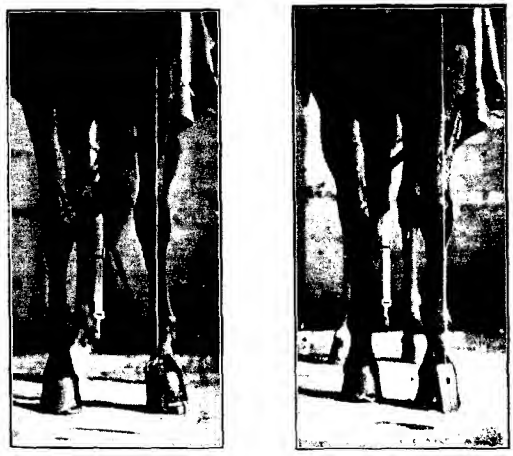


Fig. 22.—Showing how perpendicular of leg can be artificially altered by raising in or outside.

With reference to thickness: If too thick the foot is raised from the ground, and contracted feet result, and the direction of the nail holes becomes harder to control, with the result that injuries may accrue.

The heels and toes should be of the same thickness, so as to preserve a level bearing. Excessive thickness at the toe causes a strain on back tendons, and at the heels tends to straighten the pastern. If calkins are used, then toe pieces must also be put on, and they must be as low as possible. Seldom, indeed, are they necessary, for if the frog is allowed to grow properly and be in contact with the ground slipping cannot take place.

Fig. 23. — Contracted Foot, frog and bars cut away.

Fig. 24.—Open Foot, well developed frog.

Fig. 25.—Neatly Trimmed Feet.

The best form of foot surface to a shoe is perfectly level throughout. At times it is necessary to slightly "seat" the shoes along the inside when there is a tendency to flat sole, for the sole must not carry weight except at its junction with the wall. In any case the seating should not be carried all the way round, but the heels should remain flat to provide for bearing on the bars.

THE MAIZE-PRODUCING INDUSTRY IN VICTORIA.

By Temple A. J. Smith, Chief Field Officer.

(Continued from page 246.)

MANURING AND ROTATION CROPPING.

A 50-bushel crop of maize per acre is said to require for its development the following amounts of the three most essential plant foods:—

74 lbs. nitrogen,
26.3 lbs. phosphoric acid,
42.6 lbs. potassium.

Except under extraordinary conditions such as prevail on the Snowy and Tambo rivers, where the soil is annually supplied with fresh materials by siltation, some system of manuring is necessary to encourage the maximum yield of maize, and at the same time keep up the standard of fertility in the soil. To keep on taking from the land the required elements for plant growth, and so reduce in time the possibility of the land yielding a full crop, and at the same moment impoverishing the soil for other purposes, is a mistaken business policy. A rich soil should be kept rich, and a poor soil can be improved by sensible treatment or rendered useless by bad usage. Moreover, systems for the maintenance of land can be made highly profitable as they are employed.

NITROGEN.

Taking the most important plant foods in order, we find that nitrogen is taken by maize in larger quantity than any other cereal and the effect of this particular food is chiefly to build up the leaf and stem of the crop. When we realize that through the leaf system 95 per cent. of the crop's nutrition is absorbed from the atmosphere, we can readily understand how important a sufficient supply of available nitrogen is in providing a leaf surface area capable of taking in enough carbon dioxide from the air to fully develop a crop.

Nitrogen can be supplied in several ways—through good and early cultivation, as already suggested; by rotation cropping; and by the use of fertilizers in the form of nitrate of soda, sulphate of ammonia, and blood manures. These latter are all expensive, and can be avoided by cultivation and rotation cropping.

Where the rainfall is abundant a green fallow crop can be grown, in the shape of rye and vetches, sown in the autumn, in time to give it a start before the winter, at the rate of 1 bushel of rye and 6 to 10 lbs. of golden vetch. This crop can be fed off during the winter months, and will fatten eight to ten sheep or more per acre, according to the amount of growth made, and then turned under in the spring, a month or six weeks before the maize is planted. The effect of such a crop treated in the way mentioned is to supply nitrogen in sufficient amount for at least a 50-bushel maize yield; also to restore humus to the soil through the root matter, which, from rye especially, is considerably greater in quantity than from any other cereal. Other crops,

viz., red clover, peas, and rape, are also very good; red clover, however, requires a summer to mature its full value both as fodder and residual effect.

Where the rainfall is less in amount and the soils poorer, the rotation should be used in alternate years with maize, and better results will ensue.

As a general rule, rye and vetches prefer sandy loams, and red clover clay loam. These crops have a useful effect, too, in releasing some of the locked-up phosphoric acid and rendering it available for the maize that comes after. If, however, it is intended to use a nitrogenous fertilizer to supply the whole amount required, nitrate of soda, applied after the crop comes up, at the rate of 500 lbs. per acre, would be necessary; sulphate of ammonia, 400 lbs. per acre, which should be applied just before the seed is sown; blood manure, 700 lbs. per acre, applied well before the seed is sown.

It must be remembered that the natural supply in the soil should be available for at least half the nitrogen wanted by the crops, so 50 per cent. of the quantities quoted above should suffice.

PHOSPHORIC ACID.

This constituent of plant growth cannot be obtained from the atmosphere, as is the case with nitrogen, but is contained in the soil in varying quantities, mostly in an unavailable condition, gradually becoming of use through chemical and other agencies, but as a rule too slowly to keep pace with constant cropping requirements. Therefore, unless fresh supplies are applied, it is only a matter of time when the crop demands will be unsatisfied and low yields result. The quantity taken per acre by a 50-bushel maize crop is small as compared with other cereals, a 50-bushel crop of wheat, for instance, taking nearly twice the amount that maize does. Still, to keep a soil from deterioration under maize culture, no less than ¾ cwt. to 1½ cwt. should be applied.

There are several phosphatic fertilizers on the market containing this ingredient, viz., superphosphate, Thomas phosphate, and bonedust. The former is the most popular and is best used on soils containing a good natural or artificial supply of lime. Its effect is to stimulate root growth in the early stages, and later to fully develop the grain. Thomas phosphate contains more free lime than superphosphate, and is heavier and finer ground in comparison to bulk. It is eminently suited to cold clay soils and those inclined to be sour. It is slower in availability, and should the first year be used in larger quantity.

Thomas and super. are sometimes mixed, but care must be taken in the quantities used, at least two parts of super. to one of Thomas being necessary to insure good results. Bonedust is slower than superphosphate in effect, but is of special value in sandy soils and soils containing large amounts of organic matter. All phosphatic fertilizers can be applied, when the seed is sown or just before, with advantage.

POTASH.

Victorian soils generally contain potash in large quantity, and soils adapted to maize culture especially so. As a fertilizer this class of manure is not largely used at present.

There are several kinds on the market, viz., sulphate of potash, the best form to use for most purposes, having a better effect on the quality of grain, fruit, potatoes, &c., than the others. "Muriate of potash," sometimes known as chloride, is often used for maize, with good effect. "Kainit" is a lower form, chiefly useful for mangels, containing too much chlorine for soils already holding too much of that particular salt. Potash fertilizers can be applied when the seed is sown, in quantities of from ½ cwt. to 1 cwt. per acre.

LIME.

Lime, though not taken in great amounts by maize (12 lbs. per acre for a 50-bushel crop), is highly necessary in the land, for various reasons.

It has a useful mechanical action in making more friable a clay soil and consolidating a loose, sandy soil.

It releases potash and increases nitrification.

It renders the soil more wholesome, neutralizing acidity.

It reduces insect pest and diseases.

All soils deficient in lime will be benefited by applications of from 5 cwt. to 1 ton per acre every five or six years.

It should be applied in the autumn on the ploughed land and harrowed in. It is a mistake to plough lime under, as its natural tendency is to sink, being a heavy substance.

No seed should be sown until at least a month after the lime has been put on.

There are three kinds of lime on the market—

Burned lime,

Ground limestone,

Gypsum (sulphate of lime).

Burnt lime is best suited to raw, peaty soils or very sour soils. It should be slaked by emptying the bags over the paddock already ploughed and covered with a few inches of soil. It will then become slaked, and can be distributed through the spreader or by other means.

Ground limestone is applied to all soils requiring lime, and need not be slaked. It should be used in about twice the quantity per acre as compared with burnt lime.

Gypsum is specially applicable to salty soils, does not want slaking, but three times as much is required per acre as burnt lime.

At Ohio station, *vide* Ohio Agricultural Experiment Station, Bulletin 159, the addition of lime increased the yield of maize 10 bushels per acre, or 30 per cent., used both with and without manures, and that at lower cost than for manures only.

FARM MANURE.

Farm manure is of great value for maize in supplying humus, as well as food, but unfortunately is not available in any great quantity in this State, owing to the fact that our stock are not stall fed, but run in the open paddocks. Where it is possible to obtain usable amounts it should be applied in the autumn, at the rate of from 30 to 70 loads per acre. When used on sandy, loose soil it is best put on in a well-rotted state, which will have the effect of enabling such soils to retain moisture better. For stiffer clay land, undecomposed

manure, ploughed in with straw and litter, will leave the land more porous and friable as the straw and rough vegetable matter rots. Farm manure provides humus for the soil, which the mineral fertilizers cannot do, and in this lies its special value. The ploughing in of green crops will, to some extent, fill this want; and if the fodder crops in rotation are allowed to grow up to 10 or 12 inches in the early spring, and are then turned under, considerable benefit in this respect will be felt, especially in sandy soils.

SELECTING SEED.

Probably the greatest improvement in respect to average yield and suitability to local conditions can be brought about by a judicious method of seed selection. We apply this rule to all other crops and to animal breeding, and yet neglect to take advantage of the opportunities in regard to maize improvement. The few growers who have adopted selective tactics have in some cases not gone far enough, and have based their operations more on the broad system than on the narrow. To select from the best cobs in the sack or bin is not sufficient, and is liable to lead to wrong results in many cases. Mr. James, of Orbost, one of our most advanced growers, believes that careful selection on the most approved lines will do more to the establishment of the best kinds of maize to grow in new districts with the most profitable results than any other process. To achieve this end, growers must rely on their own efforts and select for themselves in each locality the various qualities required to suit each different district.

By broad selection is meant the choosing of ears or cobs from the bulk crop. By narrow selection, the choosing of ears on individual stalks in the field. The difference between the two methods in practice is shown by experiments carried out by Mr. C. G. Williams, Ohio Experiment Station, U.S.A., 1906-07:—

PLANT SELECTION v. ORDINARY SELECTION.

	Bushels.
Average yield per acre of 4 plant-selection plots	72·49
Average yield per acre of 4 ordinary-selection plots	69·26
Average gain for plant-selection	3·23
Average yield per acre of 4 plant-selection plots	89·04
Average yield per acre of 4 ordinary-selection plots	84·64
Average gain for plant-selection	4·40
Average yield per acre of 4 plant-selection plots	80·76
Average yield per acre of 4 ordinary-selection plots	76·95
	3·81

In practice on a large scale these figures have been improved upon, and Mr. James and others state it is possible and likely that if selection was generally followed on right lines, the average yield could be increased easily 10 bushels per acre, and it is the extra yield, over and above the cost of production, that pays. The time and expense spent in selecting seed would be a mere bagatelle as compared with

Well-formed Grains of Maize showing Good Germ.

Showing Square Edges of the Well-formed Grain.

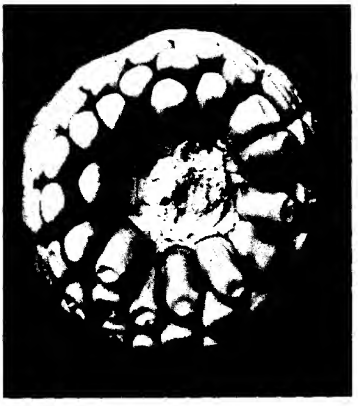
Badly-formed Grains.

the profits for one year. The effect, however, is felt for several years, and if the selective system is persevered in, it will lead to still further success as time goes on.

Seed should be selected for its—

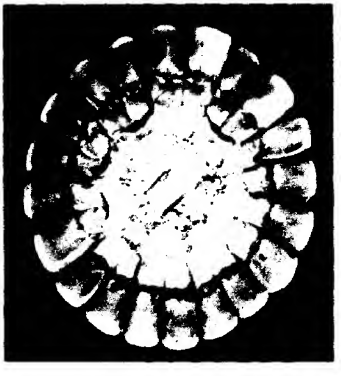
1. Trueness to type.
2. Adaptability to climate and other circumstances.
3. Uniformity.
4. Proportion of grain to cob.
5. Height of stalk and of ears.
6. Angle of the ear on the stalk.
7. Shape and weight of the ear, and number of ears.
8. Freedom from disease and general strength of plant.
9. The state of the husk.
10. Manner in which tips and butts are filled.
11. Space between rows of grain.
12. Shape of grain, and colour.

Types vary, and the selector should make himself conversant with the requisite qualities in the special types that he is handling. If possible, it is a good plan to get a few ears of whatever type is desired and make them the basis on which to select, having in mind colour,



A well-filled Butt of Maize.

shape of ears and grain, space between rows, and general appearance. Maize is self-fertilizing, and after a few years tends to fix its type when not affected by hybridization from other varieties, a system of selection greatly accelerating this desirable result.

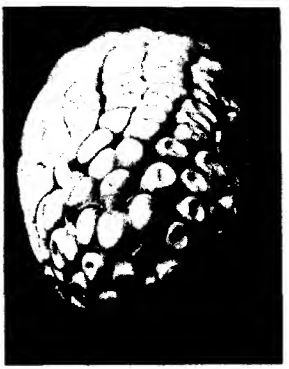


A well-packed Ear, showing no Waste Space.

In choosing for adaptability, local considerations must bear a large part. The length of season, ordinary periods of summer rainfall, suitability of soil, are possibly the most important points to observe. There are others, however, that should be attended to, such

as the ability of the stalk to stand up under certain conditions of rainfall and wind. Proof is not wanting that such qualities are hereditary, and ears should not be selected from stalks that go down naturally. Another and important matter lies in the height of the ear or ears on the stalk; these can be too high or too low. Generally speaking, 4 ft. 6 in. is a useful height for the first ear, though some growers prefer a lesser height. Where floods are likely to occur during the ripening season, as is the case in some localities, it is best to aim at a sufficient height to avoid trouble in this respect, as submerging the cob causes mildew, and disease destroys the bright colour. Too high an ear makes more labour in picking, and causes greater leverage on the plant inclined to go down.

It is found that maize ripens somewhat unevenly, and, in selecting for length of ripening period, attention must be paid to those stalks which mature the ear at the right stage to suit the average season. Much also depends on the nature of the soil and closeness of the plants as to the influence on individual stalks and ears. An isolated plant



An Ear well filled to the top.

in the field which has more available space than the majority may develop one or more ears well, while if the same plant had enjoyed only the same privileges as the remainder of the crop, its product might have been below the average. Such plants should be avoided in selecting seed, and only those grown under normal conditions taken. The judgment of the grower is largely called into play here in regard to the capability of his soil, as it is found that the best returns are made on some soils where only one plant per hill, bearing one ear, will yield best; on other soils, three plants per hill, carrying from one to two, or even three, ears, give best results. In the former case the soil is of low quality, or has a poor moisture-holding capacity; in the latter the reverse obtains. To grow more stalks than is necessary to produce the maximum quantity of grain is an error, which merely taxes the land unduly, and to no useful purpose. Uniformity is highly necessary, and in observing the proportionate length of the ear to its

diameter, colour, shape of grain, and size, and selecting with the object of getting uniform seed for future use, a more attractive sample of maize is produced, truer to type and of greater value.

The proportion of grain to cob is extremely variable. A good ear should be 75 per cent. grain, some maize exceeding this proportion, reaching 85 per cent., and when we realize that in other cases the proportions are reversed, we see why it is that some cribs of maize yield so much more than their neighbours. The number of rows of grain do not affect this question to the same extent as the shape, depth, and solid packing of the grain. The shape of the ear, too, is of consequence, and this should be cylindrical, measuring in circumference about three-fourths of the length. Ears heavy to the feel are generally well filled, and it is very evident here, where the value of selection applies. A good, well-filled ear will have the grain wedge-shaped, deep, square on the top, with the smallest possible space between the rows.

The open, badly-packed ear admits moisture, disease, and insects, and, in addition to yielding a bad sample of grain, is light in weight.

(To be continued.)

HINTS TO SETTLERS.

AN EIGHT-BAIL MILKING SHED, CHAFF-HOUSE, AND IMPLEMENT SHED.

By J. Wilson.

The accompanying illustrations are for an eight-bail milking shed, chaff-house, and implement shed.

QUANTITIES.

At present price of material in Melbourne, it would cost £64 landed on trucks at Spencer-street Station.

SPECIFICATIONS.

The bottom plates of 4-inch by 2-inch hardwood are set on stumps of 4-inch by 4-inch redgum spaced about 4 feet between, and sunk in ground 2 feet. Top plates of 4 inch by 2 inch, except at front of milking shed and outer plate of implement shed. The front plate, 4-inch by 3-inch, of milking shed is carried on 4-inch by 4-inch hardwood posts tarred at bottom and sunk 2 feet in ground. On top of each of these intermediate posts is fixed a short plate of 4-inch by 3-inch hardwood, 4 feet long, to prevent the main plate from sagging. The outer plate of implement shed is 6-inch by 2-inch hardwood, carried by a 4-inch by 4-inch hardwood post at the centre, checked out 6 inches by 2 inches to receive top plate, and tarred at bottom and sunk 2 feet in ground. Angle studs of 4-inch by 4-inch hardwood, and all other studs 4-inch by 1½-inch hardwood, spaced about 18 inches centres, and let into plates ⅜-inch, and

well spiked with 3-inch nails. Walls to be well braced and sunk in flush (braces 3-inch by 1-inch hardwood), and covered externally with weatherboards, showing a 5½-inch weather to each board; fix angle stops of 3-inch by 1½-inch at each corner. Rafters, 4-inch by 2-inch hard-

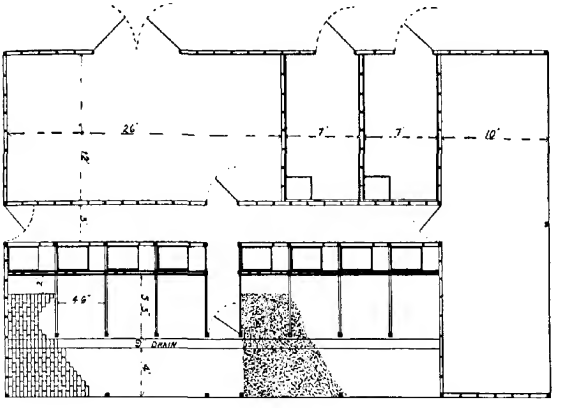


Fig. 1.—Ground Plan of an Eight-bail Milking Shed, Chaff House, and Implement Shed.

wood, spaced about 3-feet centres, well nailed to top plate ridge and hip boards (ridge and hip boards 8-inch by 1-inch hardwood). All cuts and bevels for rafters, jack rafters, and creeping rafters can be obtained by setting bevel to ones shown on the plan. Fix purlins of 3-inch by

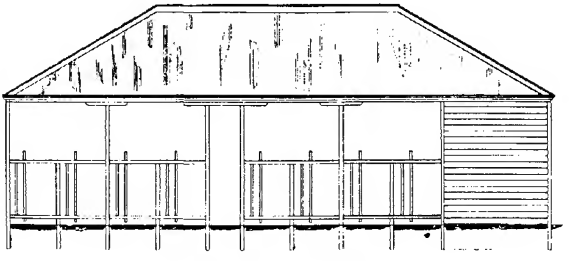


Fig. 2.—Front Elevation.

1½-inch hardwood, spaced about 4-feet centres, and well nailed to rafters to take iron. Fix collar ties as shown. Cover the whole of roof with 26-gauge galvanized corrugated iron, and ridge with 16-inch galvanized iron ridging, fastening same with 2½-inch galvanized spring-head nails;

give a lap and half cover to each sheet. Bails are formed with 4-inch by 4-inch posts, hardwood, sunk 2 feet in ground and mortised to receive partition rails, 4-inch by 1½-inch hardwood. Fix runners, 3-inch by

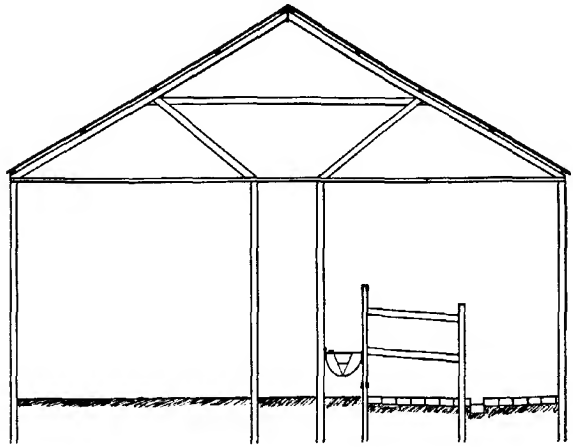


Fig. 3.—Cross Section of Building.

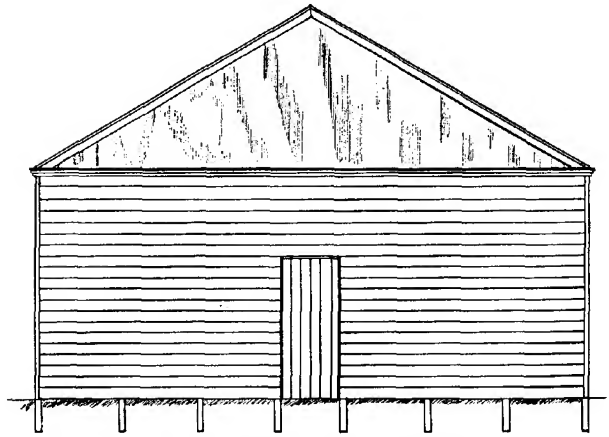


Fig. 4.—End of Elevation of Building.

1½-inch hardwood; the first pair, from the ground to top edge, is 9 inches, and the second pair comes level with the top of bail post, 5 feet from ground. The posts will require to be checked out 1 inch on each side

to receive runners, leaving 2 inches on posts to allow the bail tongues to work freely. Fix studs as shown. The first stud is 12 inches to furthest edge from post, and between this stud and bail tongue is 7 inches *(a 6-inch bolt is allowed for bail tongue).* The feeding troughs are made as shown on plan; the ends are of 6-inch by ⅝-inch T. and G. flooring, crossed braced with the same material; the ends of troughs are cut to a half-circle. Fix a 3-inch by 1-inch batten at top edges of troughs to act as stiffening pieces. Starting from the bottom edge of outside batten, nail with 1½-inch clout tacks, 24-gauge galvanized flat iron, bending it to the circle. On the top edge of the iron form a roll

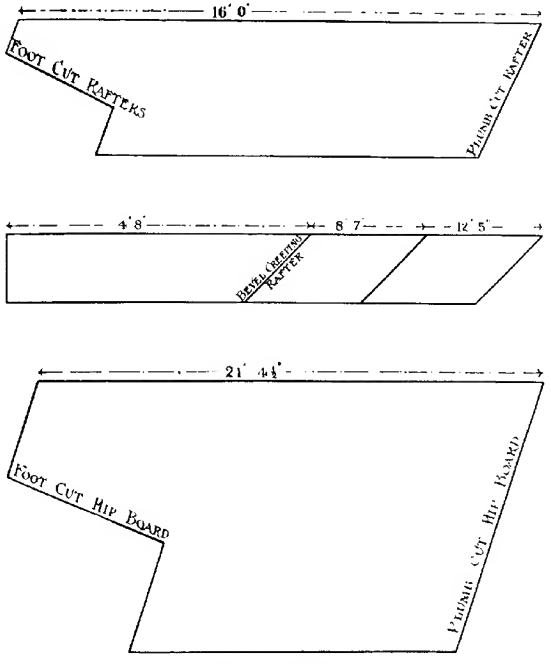
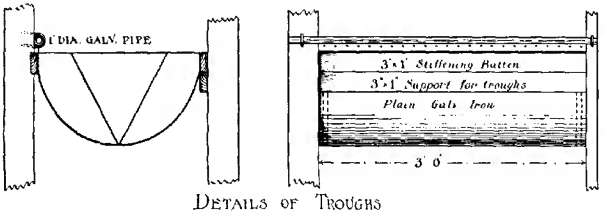


Fig. 5.—Rafters.

(to take a piece of pipe 1-inch diameter), and well rivet same. Fix a piece of pipe, 1-inch diameter, to studs, 3 feet from floor, with strong staples, to act as a hinge to allow the troughs to be tipped back for cleansing purposes. Fasten on top edge, and 3 inches from back, a 3-inch by 1-inch batten; this will prevent the cows from nosing food over the backs of feed trough. Fix a 3-inch by 1-inch batten to bail posts to rest front of feed trough on. In loose-boxes, line up walls internally for 6 feet with 6-inch by 1-inch hardwood, and provide a feed-box in each, made of 6-inch by ⅝-inch T. and G. flooring.

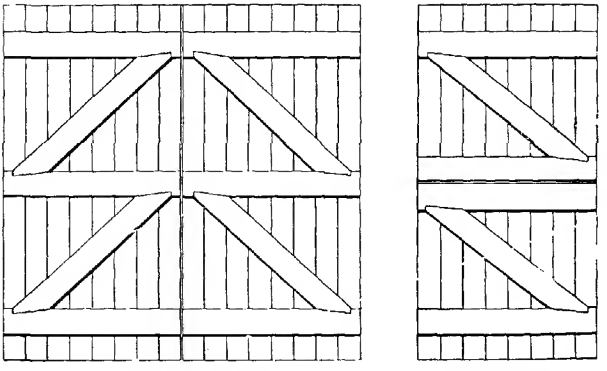
For the chaff-house, a pair of doors are provided to fit an opening 7 feet by 8 feet, and a single door 6 ft. 6 in. by 3 feet; passage doors (two) 6 ft. 6 in. by 3 feet, and loose-box doors 7 feet by 4 feet, cut through the middle on an angle. All doors to be braced diagonally, and ledgers to be of 6-inch by ⅞-inch T. and G. flooring, hung with 18-inch T hinges and fastened with 12-inch tower bolts. Make a single gate



DETAILS OF TROUGHS

Fig. 6.

for passage between cow bails out of 4-inch by 3-inch and 3-inch by 2-inch heads and 3-inch by 2-inch and 3-inch by 1-inch rails. Heads are to be mortised out to receive rails top and bottom; rails are 3 inches by 2 inches, and intermediate rails 3 inches by 1 inch; hang with 18-inch T hinges, and fasten with 12-inch bolts. The floor may be laid with



CHAFF HOUSE DOORS LOOSE BOX DOOR

Fig. 7.

bricks, or concrete. If bricks are used they should be laid on a sand bed and well grouted with cement, 3 to 1 mixture. It takes 1,000 bricks for the front portion of cow bails; 2 feet may be filled in with clay and well rammed. If concrete, the quantity required is 5 cubic yards, to cover 5 inches deep, and the approximate cost is, labour and material, £1 15s. per cubic yard. The whole of the exterior wall should have at

least two coats of paint, and the method of mixing concrete is given in *Journal of Agriculture*, September, 1912, page 578.

MATERIAL FOR EIGHT-BAIL MILKING SHED, CHAFF-HOUSE, AND IMPLEMENT SHED.

Stumps, redgum, 4-inch by 4-inch; forty-five, 2 feet lengths.
Hardwood—Plates, 4-inch by 2-inch; six, 18 feet; thirteen, 14 feet; four, 15 feet; four, 13 feet lengths.
Hardwood—Plates, 4-inch by 3-inch; two, 20 feet; one, 13 feet length.
Hardwood.—Plates, 6-inch by 2-inch: one, 15 feet; one, 14 feet length.
Hardwood—Studs and posts, 4-inch by 4-inch; seventeen, 10 feet; five, 12 feet; eight, 7 feet; eight, 6 feet lengths.
Hardwood—Studs, 4-inch by 1½-inch; one hundred, 10 feet lengths.
Hardwood—Rafters, 4-inch by 2-inch; eighteen, 16 feet; eight, 13 feet; eight, 9 feet; eight, 5 feet lengths.
Hardwood—Collar ties, 4-inch by 1½-inch: eight, 16 feet lengths.
Hardwood—Ridge and hips, 8-inch by 1-inch; one, 23 feet; four, 22 feet lengths.
Hardwood—Purlins, 3-inch by 1½-inch; 700-feet run.
Hardwood—Struts, 4-inch by 1½-inch: eighteen, 7 feet lengths.
Hardwood—Runners, tongues, and studs, 3-inch by 1½-inch; eight, 19 feet; eight, 6 feet; eight, 5 feet lengths.
Hardwood—Partition rails, 4-inch by 1½-inch: sixteen, 8 feet lengths.
Hardwood—Lining for loose-boxes, 6-inch by 1-inch; forty-eight, 12 feet; twelve, 14 feet lengths.
Hardwood—Small gate, 4-inch by 3-inch; one, 5 feet; 3-inch by 2-inch; two, 6 feet; 3-inch by 1-inch: two, 6 feet lengths.
Doors, 6-inch by ⅝-inch T. and G. flooring; three, 12 feet; eight, 9 feet; three, 8 feet; thirty-four, 7 feet; and twenty-four, 6 ft. 6 in. lengths.
Feed boxes, 6-inch by ⅝-inch T. and G. flooring; 87-feet run.
Feed boxes, 6-inch by ⅞-inch T. and G. flooring; thirty-two, 2 feet; sixteen, 3 feet lengths.
Feed boxes, hardwood, 3-inch by 1-inch; two, 19 feet; twenty-four, 3 feet lengths.
Angle stops, out of 6-inch by 1½-inch T. and G.; 3-inch by 6½-inch; six, 11 feet lengths.
Door stops, out of 6-inch by ⅞-inch T. and G.; 3-inch by ⅞-inch; twelve, 7 feet; five, 3 feet; one, 8 feet lengths.
Weatherboards, pine, 3,500-feet run.
Galvanized corrugated iron, 26-gauge, fifty-six, 8 feet; fifty-six, 9 feet lengths.
Galvanized plain iron, 24-gauge, four, 6 feet by 3 inches sheets.
Galvanized ridging, 26-gauge, 16-inch; twenty 6 feet lengths.
T. hinges, 18-inch; ten pairs.
Bolts, eight, 6-inch by ½-inch.
Spouting, O.G., 5-inch; thirty-eight, 6 feet lengths.
Spouting brackets, 5-inch; six dozen.
Galvanized spring-head nails, 2½-inch; 28 lbs.
Clout tacks, 1½-inch; 2 lbs.
Tinman's rivets, ⅝-inch; 1 lb.
Downpipe, 3-inch; four, 6 feet lengths.
Wire nails, 2-inch, 84 lbs.; 3-inch, 20 lbs.; 4-inch, 8 lbs.
Bricks, 1,000.
Sand, two loads.
Cement, two barrels.
Tower bolts, 12-inch; eleven.
Braces, hardwood, 3-inch by 1-inch; 150-feet run.

FIFTH VICTORIAN EGG-LAYING COMPETITION, 1915-1916.

Commencing 15th April, 1915; concluding 14th April, 1916.

CONDUCTED AT THE BURNLEY SCHOOL OF HORTICULTURE.

Six Birds. Pen No.	Breed.	Owner.	Total, 15th April to 14th May.	Position in Competition.
		LIGHT BREEDS.		
		WET MASH.		
19	White Leghorns ..	L. G. Broadbent ..	135	1
60	.. ..	H. C. Brock	129	2
33	.. ..	A. W. Hall	126	3
6	.. ..	F. Dohlssen	125	4
2	.. ..	E. A. Lawson	124	5
7	.. ..	Marville Poultry Farm ..	123	6
25	.. ..	Giddy and Son	118	7
21	.. ..	E. B. Harris	116	8
16	.. ..	N. Burston	115	9
52	.. ..	A. A. Sandland	114	10
8	.. ..	C. J. Jackson	113	11
9	.. ..	J. Schwabb	112	12
51	.. ..	A. H. Mould	109	13
39	.. ..	W. M. Sewell	109	
34	.. ..	H. McKenzie and Sons ..	105	15
53	.. ..	W. G. Swift	104	16
5	.. ..	J. J. West	103	17
32	.. ..	F. Hodges	103	
42	.. ..	W. M. Bayles	101	19
30	.. ..	A. E. Silbereison	101	
1	.. ..	Mrs. H. Stevenson ..	101	
46	.. ..	R. Berry	99	22
26	.. ..	A. Mowatt	98	23
4	.. ..	R. Hay	97	24
3	.. ..	J. H. Gill	96	25
18	.. ..	D. Adams	96	
36	.. ..	Weldon Poultry Yards ..	94	27
41	.. ..	Mrs. F. M. Oliver ..	94	
22	.. ..	S. Buscumb	93	29
47	.. ..	J. C. Armstrong	92	30
38	.. ..	G. McDonnell	92	
59	.. ..	W. G. Osburne	89	32
57	.. ..	R. Mitchell	88	33
48	.. ..	C. J. Beatty	88	
58	.. ..	Thirkell and Smith ..	87	35
40	.. ..	C. C. Dunn	85	36
10	.. ..	A. E. Tuttleby	84	37
17	.. ..	Mrs. E. Zimmermann ..	83	38
50	.. ..	John Hood	79	39
11	.. ..	J. B. Brigden	71	40
24	.. ..	Lysbeth Poultry Farm ..	70	41
15	.. ..	H. N. Miramis	70	
20	.. ..	R. W. Pope	66	43
13	.. ..	T. Hustler	65	44
54	.. ..	W. G. Clingin	64	45
28	.. ..	R. Lethbridge	63	46
31	.. ..	L. McLean	60	47
12	.. ..	G. Hayman	59	48
55	.. ..	W. N. O'Mullane	57	49
23	.. ..	Fulham Park	57	
14	.. ..	W. Flood	56	51
43	.. ..	H. L. Merrick	56	
37	.. ..	A. Ross	53	53
49	.. ..	Bennett and Chapman ..	49	54
45	.. ..	South Yan Yean Poultry Farm	49	
56	.. ..	C. Hurst	47	56
44	.. ..	J. A. Donaldson	38	57
27	.. ..	J. A. Stahl	5	58
		Total	5,075	

FIFTH VICTORIAN EGG-LAYING COMPETITION, 1915 16- *continued.*

Six Birds. Pen No.	Breed.	Owner.	Total, 15th April to 14th May.	Position in Competition.
		LIGHT BREEDS.		
		DRY MASH.		
66	White Leghorns ..	E. A. Lawson	134	1
72	,, ..	Mrs. E. Zimmermann ..	131	2
80	,, ..	W. H. Robbins	126	3
65	,, ..	Thirkell and Smith ..	123	4
62	.. ..	Benwerren Egg Farm ..	123	5
64	,, ..	W. M. Bayles	122	6
79	.. ..	Lysbeth Poultry Farm ..	113	7
76	,, ..	A. A. Sandland	95	8
69	,, ..	E. MacBrown	92	9
78	.. ..	H. Hanbury	90	10
67	.. ..	C. C. Dunn	89	11
63	.. ..	A. H. Padman	86	12
68	.. ..	H. McKenzie and Son ..	83	13
71	,, ..	Moritz Bros.	49	14
73	.. ..	C. L. Lindrea	29	15
61	.. ..	Mrs. H. Stevenson ..	28	16
74	.. ..	J. H. Gill	18	17
77	.. ..	South Yan Yean Poultry Farm	18	17
75	.. ..	Fulham Park	9	19
		Total	1,558	
		HEAVY BREEDS.		
		WET MASH.		
81	Black Orpingtons ..	Mrs. T. W. Pearce ..	113	1
97	.. ..	Marville Poultry Farm ..	135	2
91	.. ..	D. Fisher	113	3
100	.. ..	J. H. Wright	111	4
88	.. ..	J. McVilan	94	5
96	White Orpingtons ..	Stranks Bros.	93	6
90	Black Orpingtons ..	Oakland Poultry Farm ..	88	7
91	.. ..	A. Greenhalgh	83	8
85	.. ..	H. H. Pump	78	9
95	Silver Wyandottes ..	W. H. Forsyth	74	10
87	Black Orpingtons ..	W. G. Spencer	72	11
99	.. ..	L. McLean	70	12
89	Rhode Islands Red	E. W. Hippe	63	13
83	Black Orpingtons ..	G. Mayberry	57	14
86	.. ..	C. E. Graham	48	15
84	.. ..	Cowan Bros.	28	16
92	.. ..	J. Ogden	21	17
93	.. ..	L. W. Parker	14	18
82	White Wyandottes	J. B. Brigden	..	19
98	Faverolles ..	K. Courtenay	..	19
		Total	1,385	

A. HART,
Chief Poultry Expert.

Department of Agriculture,
Melbourne, Victoria.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Principal, School Horticulture, Burnley.

The Orchard.

PLANTING.

June is the month usually favoured for the planting of all deciduous orchard trees, and this work should now be carried out. The ground should have been previously ploughed, subsoiled, and drained in anticipation of the planting of the young trees. The young trees should be planted to the same depth as they were growing in the nursery beds, and the holes for their reception should not be any deeper than is necessary to contain the roots. A deeper hole only provides soakage room for the soil moisture, and the hair roots are rotted as soon as they are formed. In order to keep the tree holes at an even depth, a plough furrow may be run along the whole length of the row, and each tree could then be planted to the depth of the furrow, and no deeper. By this means any soil moisture, or an excess of moisture, is evenly distributed, and is not likely to settle round the growing roots.

Before planting, the roots of the young trees should be well pruned, cutting them back hard, leaving a very small root-system; generally only about one-third of the original roots being left.

It is rarely necessary to manure newly-planted trees when they are being planted. If manure is required it should either be well worked through the soil previously, or else it should be used as a surface mulch some considerable time after planting.

In planting, growers will do well to study such varieties as are valuable as export fruit in apples and pears, and other classes are generally profitable if planted for a succession. A great deal of attention is paid to new varieties, and it is to be regretted that, in the search for newer varieties, which are so often a failure, the older and more valuable varieties may be lost sight of altogether.

An up-to-date orchard should contain very few varieties: the fewer varieties simplify many orchard operations considerably, and the crop is far more easily handled. In planting, it is also essential that the question of cross-fertilization should be studied, so that the blossoming of each variety shall help the other in the setting of the fruit.

SPRAYING.

All the winter pests will now come in for attention, and trees should be freed, as far as possible, from all kinds of scale insects, bryobia mite, woolly aphis, &c. The red oil or crude petroleum emulsion is most suitable for the eradication of these pests.

Spraying before pruning is not the general rule, and yet it seems to be the safest, especially where scales or woolly aphis are prevalent. Certainly a much larger amount of spray material will be required, but much better work will be done. There will be no danger whatever from future contamination from any of these pests on the undestroyed prunings, or from any small clippings that may be lying ungathered around the tree.

Another point in favour of this is that, if by any means, whether by careless spraying or the use of bad materials, any part of the tree is left, so that the pest is not destroyed, and so continues to increase, then a second spraying can be given while the tree is still dormant.

DRAINING.

In old-established orchards a thorough scheme of draining does more to invigorate and resuscitate the trees than any amount of surface cultivation or manuring. The work is easier done in June and July, and, where necessary, it should be started at once. Drainage pipes are more generally used, but stones, logs, waste timber, brushwood, and charcoal are all valuable as drainage mediums. The benefits of soil drainage have been so frequently urged that it is hardly necessary to repeat them again.

Vegetable Garden.

The principal work in this section for June is the preparation of beds for the main crops of vegetables. Most vegetables require, and thrive best in, a thoroughly well-worked soil, the soil being as friable as possible. The beds should be deeply worked: all manure should be well rotted, and evenly distributed throughout the soil.

One point to be emphasized is a good system of rotation, whereby a continual succession of the different classes of vegetables is grown in the beds. This is not only valuable as a method of soil restoration and improvement, but it helps to reduce and weaken any insect or fungus disease that may have been present.

Asparagus beds may now be renovated, and new beds planted. Onions and any other seedlings that are sufficiently far advanced may now be planted out, and succession crops of spinach, radish, peas, broad beans, leeks, lettuce, carrots, &c., should now be planted. The planting of rhubarb beds should now be completed.

Flower Garden.

General cleaning up and digging will be the work for this month in the flower section and shrubbery. Where the soil is heavy or sour, or where sorrel is plentiful, the garden should be given a heavy dressing of fresh lime, giving a fair dusting all over the surface. Lime should not be used in conjunction with leaves, garden debris, leaf mould, stable manure, or any other organic matter used for humus. These should be first disposed of by digging well into the soil: then shortly afterwards a top dressing of lime may be given. Should no humic material be used, the lime may be dug in with the autumn digging. In cleaning up the gardens all light litter and dead foliage should either be dug in, or better still, should be placed in an out-of-the-way corner to form a compost heap. Leaf mould is especially useful in any garden, and where such plants as Azaleas, Liliums, Rhododendrons, &c., are grown, or for pot-plant work, it is exceedingly valuable. In forming the compost heap, no medium whatever should be added to help the rotting down of the leaves, unless it be a little sand. Any chemical added will render the mould unsuitable for its special objects.

Any hardy annuals may be planted out, such as stocks, pansies, wallflowers, &c., and cuttings of roses and hard-wooded shrubs may also be planted.

REMINDERS FOR JULY.

LIVE STOCK.

HORSES.—Those stabled and worked regularly should be fed liberally. Those doing fast or heavy work should be clipped; if not wholly, then trace high. Those not rugged on coming into the stable at night should be wiped down and in half-an-hour's time rugged or covered with bags until the coat is dry. Old horses and weaned foals should be given crushed oats. Grass-fed working horses should be given hay or straw, if there is no old grass, to counteract the purging effects of the young growth. Old and badly-conditioned horses should be given some boiled barley or linseed. Mares due to foal early if in poor condition should be fed liberally. Commence preparing stallion for season, especially if worked.

CATTLE.—Cows, if not housed, should be rugged. Rugs should be removed and aired in the daytime when the shade temperature reaches 60 degrees. Give a ration of hay or straw, whole or chaffed, to counteract the purging effects of the young grass. Cows about to calve, if over fat, should be put into a paddock in which the feed is not too abundant. Newly-calved cows unless in good condition should be fed liberally to stimulate milk flow. Calves should be kept in warm, dry shed. The bull may now run with the cows

PIGS.—Supply plenty of bedding in warm, well-ventilated styes. Keep styes clean and dry. Store pigs should be placed in fattening styes. Sows in fine weather should be given a grass run. Young pigs over two months old should be removed from lucerne run.

SHEEP.—Class all breeding ewes. Those not found profitable in fleece, and no sign of being in lamb, if fat, should be realized on while values are high. Examine mouths of 5-year-old ewes and over; feed slips through, if any teeth are out, loose, or open. *Ewes will thrive much better, and often fatten, if made* "gummies."

Select best rams for future use; remember wide thick sheep are best thrivers; they must carry a profitable fleece as well. Keep all ewes about to lamb well crutched in a season like this, they will scour greatly. Free udders from wool at same time. Consider well before selling early-born, best-fleeced ewe lambs.

POULTRY.—Mating of birds intended for breeding purposes should receive immediate attention. Ten second-season Leghorns or Minorcas, or six of the heavier birds, such as Orpingtons, Plymouth Rocks, and Wyandottes (preferably in their second year), with a vigorous unrelated cockerel will be found satisfactory. Table birds bred in March or April will pay handsomely prior to the Cup Carnival A tonic in drinking water as a preventive against chicken pox and other ailments is advantageous.

CULTIVATION.

FARM.—Finish sowing barley, peas and beans, and late white oats in backward districts. Trim hedges. Fallow for potatoes, maize, and other summer crops; in early districts, plant potatoes. Graze off early crops where possible.

ORCHARD.—Continue to plant deciduous fruit trees, bush fruits, and strawberries. Continue cultivating and pruning. Spray for mites, aphides, and scales.

FLOWER GARDEN.—Plant shrubs, climbers, and permanent plants, including roses; also annuals and herbaceous perennials, early Gladioli, Liliums, Iris, and similar plants. Continue digging, manuring, trenching, and liming.

VEGETABLE GARDEN.—Plant out seedlings. Sow seeds of carrots, parsnips, cauliflowers, onions, peas, broad beans, and tomatoes. Dig all vacant plots.

VINEYARD.—Proceed with pruning, burning off, and ploughing. Complete, as early as possible, the application of manures other than nitrates and sulphate of ammonia if not already done. Mark out land for new plantations. If ground is in good order and not too wet, proceed with plantation of young vines (unpruned). Remove cuttings or scions from vines previously marked, and keep fresh by burying horizontally in almost dry sand in cool, sheltered place. Permanently stake or trellis last year's plantations.

Cellars.—Rack all young wines, whether previously racked or not. Rack older wines also. For this work choose, as much as possible, fine weather and high barometer. Fill up regularly all unfortified wines. This is a good time for bottling wine.